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Improved Steam Gage.

The liability of ordinary steam gages, which work with springs, to get out of order, and, consequently, give incorrect results, led the inventor of this gage to construct one which should show the real pressure at all times, being controlled in its action by the same agent as the safety valve, namely, a weight.

In detail the gage consists of a central tube, A, which has a small hole, B, in it to admit steam to the interior of a receiver, C. The pressure comes on the inside of this and raises it. In rising it meets with an annular weight, D, which is placed at the top. This, of course, adds so much resistance to the further rise of the receiver, which is registered through a rack and pinion, E, on the face of the gage as usual. As the pressure increases the receiver continues to rise, and takes up other weights arranged above it, as clearly shown in the engraving; the additional pressure being, of course, registered as before.

In place of these weights the inventor proposes to use a series of cylinders disposed one within and over the other in an obvious manner; these would answer the same purpose, while the gage so made would have a much neater appearance. The central chamber, F, under the receiver, has a small hole at the bottom, which carries off the condensed water of the steam. This gage is claimed to be reliable under all circumstances. A patent is now pending on it through the Scientific American Patent Agency by Joshua Lowe, of Paterson, N. J., whom address for further information.

Fig. 1

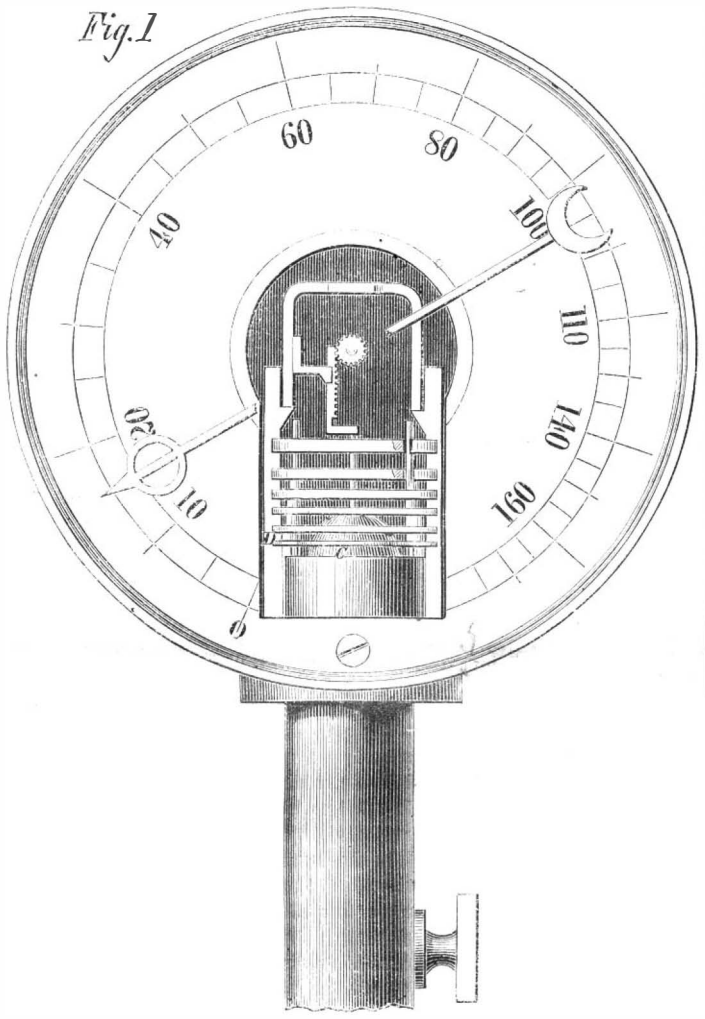
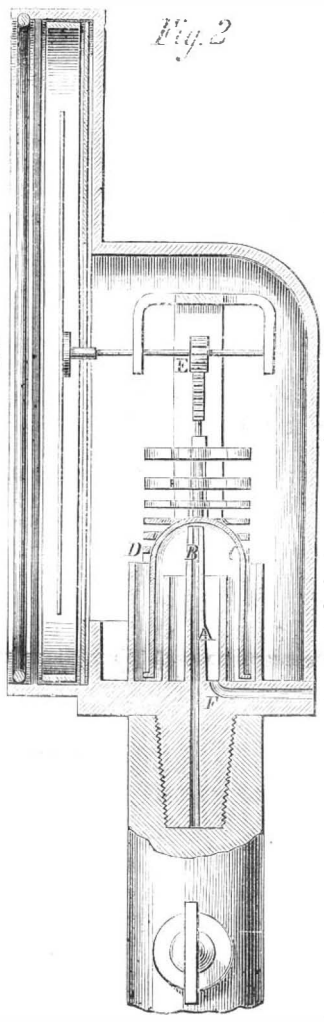


Fig. 2



LOWE'S STEAM GAGE.

POWER REQUIRED TO START A TRAIN.

We had some discussion on this subject in Vol. XI., page 214. We extract this article from Zerah Colburn's new work on the locomotive:—

"The rail is the fulcrum upon which all the power of a locomotive is exerted; and all its motions, with reference to the train, or, in other words, to space, must be referred to this fulcrum. Many an engineman has perceived this from his own observation, and has argued from it that an engine must be able to start a heavier load when the cranks are up or above the axle, than when they are below it. Now, although this conclusion is wholly wrong, it is supported by a plausible induction; and so plausible is this, that some enginemen will have it that they *know* that they can get away better with a heavy load by starting with both cranks above the axle. They have, they say, a longer leverage, the rail being the fulcrum. The reason for this notion, although it is wholly fallacious, is worth examining.

Let us suppose an engine with two feet stroke of piston, and six feet driving wheels. The crank, from the center of the axle to the center of the wrist grasped by the connecting rod, is twelve inches long, and the radius, or half diameter of the wheel, is three feet Let us, for the sake of simplicity, suppose but a single piston, and that the total pressure of the steam upon it is 10,000 lbs. When the crank stands upright over the axle, and is being pulled over by the piston in the direction to take the engine forward, we then have 10,000 lbs. exerted at the end of a lever four feet long from the rail, the resistance to be overcome at the axle being at the end of a lever three feet long, and therefore 13,333 lbs. But this is not the force with which the engine is moved forward; for opposed to it is a force of 10,000 lbs. exerted against the back cylinder cover, and transmitted through the framing of the engine to the driving axle. So only 3,333 lbs. of effective pressure is exerted to take the engine forward. Let the crank next be down, or hang vertically beneath the axle. If it were pushed from the cylinder by a force applied externally to the engine just as we might, when standing upon the ground, push the wheel of a carriage with the hand, the engine would be rolled backward. But instead of the 10,000 lbs. pressure upon the piston being effective in this manner, it is exerted at the end of a lever two feet long from its fulcrum on the rail, while it is opposed by a force of 10,000 lbs., exerted in the opposite or forward direction, through the front cylinder cover, framing, and axle boxes, and acting at the end of a lever three feet long. The backward pressure exerted by the piston at two feet from the rail, produces a backward pressure of 6,667 lbs. at the axle, three feet from the rail; but this is overcome, with an excess of 3,333 lbs., by the pressure exerted upon the front cylinder cover and through the framing. So the forward pressure, effective for moving the engine as a whole, is 3,333 lbs. in either case—that is, whether the crank stand above or hang below the axle.

"The forces exerted through the cranks upon the driving axle may be perhaps better understood if we imagine the axle not to be closely embraced by its supports but to have a considerable 'slack' in its brasses, so as to permit of the direct movement of the axle, to a certain extent, independently of the pressure transmitted from the cylinder covers. Thus, with the crank down, and with an inch clear space between the surface of the axle bearing and its support toward the hind end of the engine, so that the axle could 'come and go' one inch without taking the engine with it, we should in the case already considered absolutely roll back the driving wheel, with a force at the axle of 6,667 lbs., and we should pull forward all that part of the engine over the axle with a force of 10,000 lbs. It would be only when the 'slack' between the axle and its support was taken up that the wheel would cease to roll back, and that the effective force, in a forward direction, would be 3,333 lbs. It must not be hastily supposed, from what has been said, that the total pressure of the axle against its support is, or can possibly be, greater or less than the pressure of the support against the axle. For in the above case we have computed a backward pressure of 6,667 lbs. of the axle against its support, and a forward pressure of apparently 10,000 lbs. through the same support against its axle. But, as the force exerted and the total resistance overcome must in all cases be equal to each other, an engine advancing with a force of 3,333 lbs. must be overcoming a resistance to that amount. This resistance may be represented by a weight of 3,333 lbs., hung over a pulley external to the engine, and attached by a chain to the back of the engine framing. So that, in the case when the crank is down, 3,333 lbs. of the 10,000 lbs. pressure upon the front cylinder cover will be directly expended upon the weight being lifted (or the train being drawn), and 6,667 lbs. only will be expended upon the opposite and equal resistance of the axle, which is being pushed backward by the steam acting through the piston rod and connecting rod. When the crank is above the axle, in the case supposed, the axle will be drawn forward with a force of 13,333 lbs., while the steam pressure upon the back cylinder cover, pushing the engine bodily backward over the axle, is 10,000 lbs. in addition to the weight

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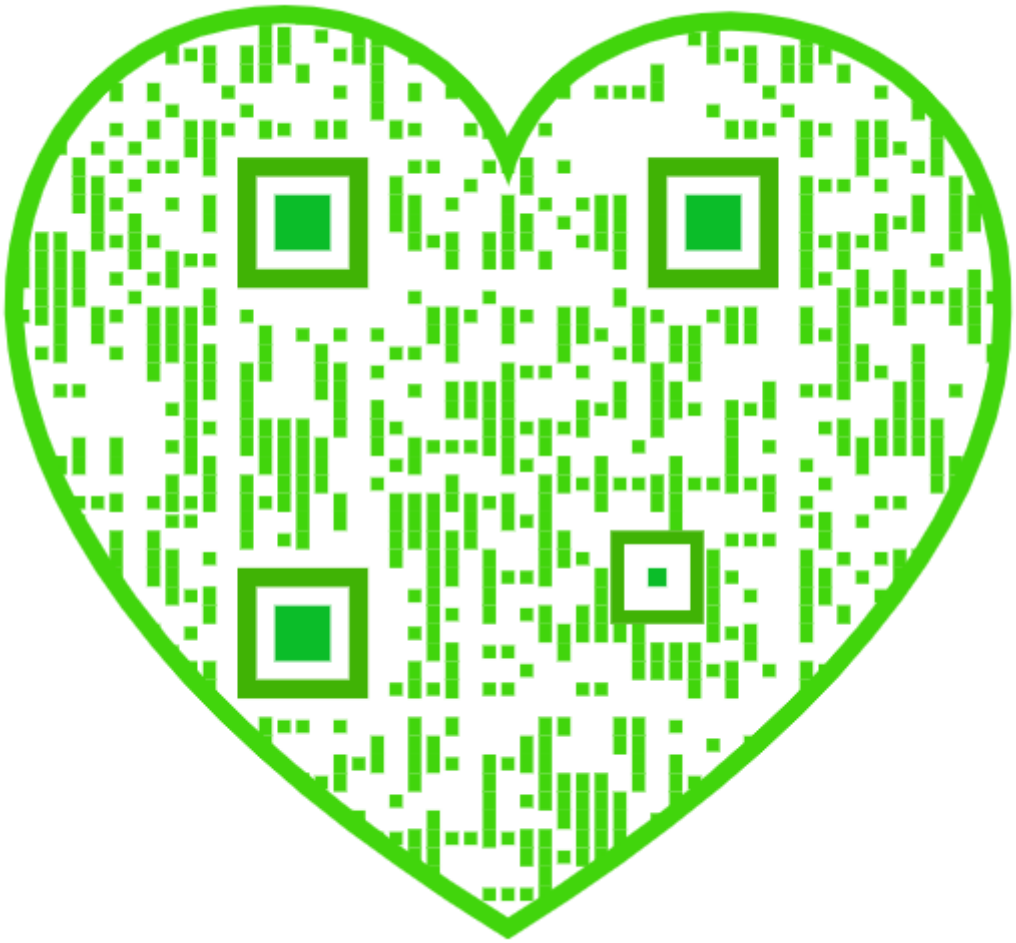

of 3,333 lbs. hung over the pulley, and which weight we have taken in this case to represent the resistance of the train. So in the case supposed we have a pressure in opposite directions between the axle and its hind support of 6,667 lbs. when the crank is down, and of 13.333 between the axle and its front support, or the front of the axle box, when the crank is up, the effective pressure applied to the train being 3,333 lbs. in both cases, as already shown. In this case, therefore, the wear on the front side of the axle box and on one side of the axle, will be twice as much as on the back of the axle box and on the opposite side of the axle. This great excess of pressure and consequent wear on the front of the axle box, in running forward, has led many to suppose, without due consideration, that the axle is always pressing forward in its box when the engine is going forward. There is, therefore, a somewhat plausible foundation for the notion occasionally entertained among enginemen, that they can start a train with more ease when the cranks are up than when they are down. The pressure exerted by the steam directly against the axle is then greater, as we have seen; but the pressure on the axle, when the crank is down, is not only less, but it is in an exactly opposite direction; and were the wheels unconnected with the engine otherwise than by the connecting rods, they would be rolled backward instead of being pulled forward. But the pull of the engine at the draw iron is, as has been seen, the same when the crank is up as when down. Although we speak of the rail as the fulcrum upon which the forces exerted through the wheel are made effective, it will be understood that it is by the weight with which the wheels press upon the rails, and by their consequent friction, that a real fulcrum is obtained. As long as they do not slip, any motion in the wheels must carry the engine bodily forward, and it is necessary, therefore, that the friction of the wheels upon the rails be always at least equal to the greatest tractive force exerted by the engine. In the case which we have been considering, that of a single piston with 10,000 lbs. steam pressure, two feet stroke and six feet wheels, the greatest tractive effort is 3,333 lbs., and the friction of the wheels upon the rails must be at least equal to this. The constant tractive force is not, however, 3,333 lbs., as at the ends of its strokes the piston exerts no useful force whatever—the effect diminishing from mid stroke, where it is the greatest. The mean tractive force will, in this case, be 2,112 lbs.

TREATMENT OF CHOLERA.

It is the opinion of every physician who has had any experience in the management of this disease, that its preliminary or premonitory stages present opportunities for its almost certain cure, when the proper remedies are applied in time. It is well established that the disease commences in almost every instance with a *painless diarrhea*, which because of its painlessness, is apt to be disregarded or considered of no consequence, but when neglected runs rapidly into the more serious stage, accompanied with vomiting, cramps, feeble pulse and collapse. But if taken in its very outset, upon the first indication of diarrhea, the stage called *cholerine*, then the administration of appropriate remedies is almost sure to be successful in arresting its further progress.

At a recent session of the New York Academy of Medicine, at which the subject of cholera, its causes, progress, and treatment, were under discussion, Dr. John H, Griscom presented an elaborate paper, in which, among other matters, he gave a translation of an essay from the proceedings of the Academy of Medicine, of Paris, written by Dr. Worms, Physician-in-Chief of the Military Hospital of Gros Caillou. Dr. Griscom, who has witnessed every epidemic of cholera in this city, and had large experience in its treatment both in private and public capacity, considers the principle upon which the recommendation of Dr. Worms is founded as correct, and the success which appears to have attended it to be based upon sound physiological and pathological reasoning.

We give the essay alluded to, translated for the Scientific American from a French journal by Dr. Griscom, who for 28 years has been one of the physicians of the New York Hospital.

"The study of the numerous cholera epidemics which have visited Europe within the past 35 years has not been sterile; it has furnished science with matter of incontestible importance. One of its most precious gifts is the establishment upon a positive basis of its prophylaxis and its relation to public hygiene, in localizing the toxic element, its transmission by the matter of morbid dejections, and in signalizing as the most decided auxiliary of this poison, the emanations of animal and vegetable substances in a state of putrefaction, the gases from privies and from stagnant waters. Another ascertained fact, and not less important, is that sudden and severe attacks of cholera, without premonitory indications, are of very rare exception, and that in a great majority of cases, a characteristic trouble of the digestive functions, and simultaneously of those of innervation and circulation, always precede for some time, and announce the invasion of the grave form of cholera.

"It is impossible not to admit that these prodromic or premonitory troubles (justly entitled cholerine), are the effect of the slow and gradual action of the toxic agent, which has not yet found either in the local circumstances, or in the individual predisposition, sufficient elements for its full extension, or the display of its full power.

"It is this preliminary phase of the malady, wherein the vitality has been, so to speak, only grazed, that the stomach does not yet refuse to receive and to absorb medicaments, which offers to the curative art its true field for the development of its power, and it is especially concerning the treatment of this premonitory phase that I ask the Academy to permit me to expose briefly the results of my observations.

"The ordinary practice in these cases consists in prescribing repose, diet, the use of warm aromatic drinks, some diaphoretics, and in the last place bismuth or opium, either pure or in the form of Dover's powder; but when the epidemic influence has become very decided, the employment of these means is far from being followed by success, and the success, when it is obtained, has often little duration; I have so often seen cholerine pass into cholera during the treatment by opiates, that in cholera times I cannot overcome the dread of opium.

"Beside, when this medication arrests the dejections, the stomach frequently remains embarrassed, and the patient feels no return of strength or appetite.

"On account of circumstances such as I have described, finding myself at the close of the epidemic of 1849 at the end of ordinary resources, I had recourse to a new and totally different medicine, which was mentioned in a letter addressed July 7th to the *Gazette Medicale*, of which letter I ask permission to reproduce a brief passage:— In the last of the month of June, when I was no longer charged with cholera service, it happened to me to receive on the 13th and 14th, seven men who had diarrhea, some of four and some of eight hours' duration. According to my habitual practice, I gave them an emetic (of two grammes of ipecac) and potions of two grammes of laudanum, also amylaceous and opiate lavements; but so far from seeing any amelioration follow this treatment, which had always succeeded with me in ordinary times, I must confess to an alarming aggravation; to the alvine dejections, which were frequent, vomiting was added; the evacuations assumed the choleraic character; the voice began to grow feeble and to diminish; the pulse became almost imperceptible, and the characteristic alteration of the face left no doubt of the nature of the affection.

"'This is one of those forms of cholera often met with among feeble subjects at the commencement or the end of epidemics. I immediately placed all these patients on the use of *mineral lemonade* (giving them a double dose of acid) and suppressed all other medicines. The effect was most striking; the very next day the countenances were ameliorated, the dejections were diminished, the skin became warm, and I found in place of a slender and almost imperceptible pulse, one well-developed and resistant, announcing a remarkable return of vitality. Three of these patients have left the hospital, and the other four eat from a half to three-quarters of their allowance.'

"This I wrote in July, 1849. Since that time in the visitation of cholera in 1853-'54, I have been enabled to apply to a much larger extent, in both the prodromic diarrhea and grave cholera, the method of treatment of which, in 1849, I had made but an insufficient essay. Its success so far as cholerine is concerned, has surpassed my expectations, the diarrheas, accompanied or not by vomitings, being arrested and cured with a promptitude altogether surprising. One may see, so to speak, the pulse rising, the skin becoming warm, the strength and appetite returning at the same time, and in a few days the patients finding themselves in a condition to return to duty.

"This result was so manifest that all the poor consumptives of my ward importuned for the same prescription of *mineral lemonade*, hoping from it the same efficacy for their colliquative diarrheas.

"Later still I have had occasion to prove the infallible fidelity of this simple means, and my most ardent wish is to see it in general use. I earnestly implore my honorable colleagues who hear me, not to regard me as influenced by an unreasonable enthusiasm, which would be wrong in a practitioner of my age; that they will suspend their judgment on the subject; the occasions for experimentation are not wanting at this moment, and I fear that they will become too numerous.

"Two, three, or at most four grammes [a gramme is about 15½ grains, troy measure] of sulphuric acid with a thousand grammes of water or a mucilaginous vehicle, with one hundred and fifty grammes of simple or raspberry sirup, makes a drink as agreeable and innocent as ordinary lemonade, and furnishes at the same time a medicine cheap, easy of preparation, and every where accessible.

"And when, as I have so often proved, my colleagues will have been able to convince themselves of the marvelous rapidity with which this lemonade arrests the evacuations, raises the pulse and the nervous system, warms the skin and gives to the patient the feeling of health, I doubt not that they will participate in the confidence with which its long usage has inspired me; as, moreover, these diarrheas are very evidently only an attenuated expression of the epidemic influence, they will naturally come to the conclusion that a medicament so powerful against cholerine, should not be indifferent in confirmed cholera.

"To repeat here the mode of my practice, in cases of prodromic diarrhea, and according to the greater or less gravity of the case, I add three, four, or at most five grammes of concentrated sulphuric acid to a killograme [a thousand grammes, equal to two pounds, eight ounces, one drachm and twenty four grains] of a sweetened decoction of salep.

"The patient takes every hour a glassful of this lemonade, and rinses his mouth two or three times after drinking it; it is seldom that four glasses are required. I permit the simultaneous use of white wines, or of champagne, but I expressly proscribe the use of beer, brandy, and alkaline mineral waters during the epidemic.

"As to confirmed cholera, my practice is almost equally simple. The patient is kept in the most complete repose. Shampooing is practiced only during the pain of cramps. Every half hour a glass of the lemonade (of from five to ten grammes of acid to a litre) [a litre is a fraction over two pints] is administered, taking advantage of the moment immediately after vomiting. He takes beside, at discretion, wine and ice.

"I think it useful to remark that the lemonade, which has a great power to suspend the alvine evacuations, produces a contrary effect upon the vomiting, increasing its frequency and duration; but this prolongation is not unfavorable, and is generally an indication of a happy termination."

Death of Mr. C. Wye Williams.

Men of science have been fast falling around us of late, and it is with regret we now add still another name to the list of those who have rested from their labors since the year began. Mr. Williams's name is too intimately connected with the principles of combustion, and his works are too well known, to need that we should point out seriatim all he has done. In fact, it is chiefly as an author that Mr. Williams is known, although he was a sound practical business man. He died on the 2nd inst, at his residence, the Nook, near Liverpool, in his eighty-seventh year. Mr. Williams was among the early mechanical improvers of mill work, having, in

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1807, erected a linen mill in Ireland in which he used iron spur gearing. This was its first introduction into that country; it was cast by Edwards, of Belfast. In 1822 Mr. Williams patented, and brought out at his own expense, the Oldham feathering wheel, which was subsequently improved, and became known as the Morgan wheel. The City of Dublin Steam Packet Company owes its existence to Mr. Williams, in whose name the company was primarily made public. He also promoted the formation of a Transatlantic Steam Service, which, however, did not succeed of itself, but merged into the present Peninsular and Oriental Steam Company. Mr. Williams, at an early date, applied water-tight bulkheads to divide a ship into separate compartments. His last work, on "Heat and Steam," was completed when the author was in his eighty-first year, and while he was yet engaged upon the experiments of which the book was the result. In this work Mr. Williams originated the idea that water as such could have no other temperature than 328° deg., steam being the cause of any higher degree of heat. However much this theory may be open to dispute, and however easily it may even be disproved, it deserves credit for the care and earnestness Mr. Williams bestowed upon it. But its propounder has passed away, although his memory will long live in his works, and will long be cherished by the many to whom his urbanity and kindness had reached.—*Mechanics' Magazine.*

INCREASE OF EXAMINERS' PAY.

While we deprecate the enactment by the House of Representatives of the bill to tax inventors $10 upon appeals from the decision of the primal Examiners to the Examiners-in-Chief, or Appeal Board, as usually termed, we regret to learn that the bill to increase the pay of the Examiners, and adjust the pay of acting Examiners, has been defeated.

The expense of living, during and since the war, renders it indispensable to the attaches of the Patent Office that their salaries be increased, and we hope to see the bill, which is reported in another column, adopted, or some similar bill enacted, before Congress adjourns. The work of the Examiners also increases in the same ratio as the business of the Office increases, and there is no reason why they should not receive a proper reward for their industry.

Give the appointments to industrious and competent men, and pay them liberally for their services. Thus the Patent Office will sustain its reputation, otherwise it will be in danger of lapsing into the dormant state which characterized it under some of the early Commissioners.

Pay liberally, employ honest and energetic examiners—those who will feel it a disgrace to let their work get far behind—and the inventor's interests will be promoted and the industry of the country advanced. The Patent Office has already a large fund of its own creating, and the receipts of fees from inventors is considerably more than adequate to meet its current expenses.

We hope that Congress will see the propriety of increasing the pay of the Examiners, and of adjusting the pay of those who have acted as Examiners without getting the lawful salary, which can easily be done from the receipts of the Office without imposing an additional tax upon the patentee.

Above all things, however, do not levy a tax upon the injured party to pay the expense of reviewing and often reversing the erroneous decision of the primal Examiner.

Curious Properties of Magnesium Amalgam.

At a recent meeting of the Chemical Society of London Professor Wanklyn read a paper "On Magnesium," detailing some experiments made conjointly by himself and Mr. E. T. Chapman. The authors found the magnesium ribbon of commerce to be remarkably pure, which was proved by the quantities of hydrogen evolved during the solution of known weights of the metal in certain diluted acids. The behavior of the metal in resisting the attack of chlorine, bromine, and iodine, was pointed out, and also the very singular properties of the magnesium amalgam, which decomposed water with even greater facility than sodium amalgam.

Professor Abel mentioned an observation of his own to effect that magnesium filings might be fused with nitrate or chlorate of potash without immediately undergoing oxidation, and only at a very high temperature, and long after the oxygen had been freely evolved, did it seem possible to start the ignition and brilliant combustion of the metal. This tardiness was discovered in attempting to employ metallic magnesium for certain pyrotechnic purposes.

Inefficient Pumps.

An inquiry is now being made in England as to the cause of the loss of the *London*, recently wrecked in the Bay of Biscay with great loss of life. It would appear that this vessel was lost through inefficient pumps. She was not leaky, but finally foundered and went down from defective pumps. A correspondent of the *London Morning Journal* says:—

The ship *London* is said to have shipped seas, but she is not proved to have leaked. Then I asked why the water in her was not pumped out? The answer is, because there was not an effective pump, properly fixed, in the ship, so as to enable them when she shipped a sea to do so. In that case what was to prevent the vessel from sinking, when the weather continued rough and the seas were continually entering her? The best ship ever built in that case must go down.

In evidence it came out that this vessel had a pump sufficient to throw over 4000 gallons of water per minute, or 70 hogsheads. This pump, then, was sufficient to keep the water out clear, or even if she had a hole in her side large enough for a man to get through. Then, what became of this pump? was it worked? I conclude not, for this reason—it was connected with the ship's engine, and useless. Then, I say, this pump was not a fit one for a ship with 300 living beings on board. If the fire had not been put out, this engine, like all others, would be likely to be broken down in bad weather, and if the ship was making water and shipping seas she was bound to sink, as the pumps would then be useless. We are next told she had a donkey engine on deck, and a pump attached, but not a word was stated in evidence as to what quantity of water it would throw out per minute; but it did come out that oven this pump was not worked on the first day. Then, I ask, what was done to clear the ship of water? Why, a comedian, the only energetic man that appeared to be in the ship, attempted, with the assistance of the passengers, to bail her out with buckets, and not a sailor came forward to assist them. No further explanation is wanted to prove that the ship sank with all her living freight for the want of effective pumps. Had she good pumping gear there would be no danger of the ship sinking. All this has been lost sight of through all the examinations. It was stated that the donkey engine was put to work the next day, but nothing said as to what quantity of water it threw out, which is evidence that this engine, like the good-natured passengers, were only attempting to dip out the sea with a limpet shell. I am aware it is easy to find fault, but I will not be contented with that, I will do my best to show those in power what ought to be done in all ships that carry passengers—first noticing, in all my experience I never saw a ship with good pumps and properly fixed. I have here to call the Lloyds agents' attention to these points, and tell them that eight-tenths of all the ships that founder is from want of effective pumping powers. It is to be proved that the *London*, and likewise many other vessels that sank in the same storm, had no means of taking out the water but by buckets, and that amounts to little or nothing. I say, without fear of contradiction, that every large ship that goes to sea, whether built of iron or wood, should have one or more powerful donkey engines fixed upon the deck, with the fires so protected as to keep the water from extinguishing them. The engine, or engines, should either be fixed, or movable on tramroads, and connected to the pumps by belts, and worked so as to throw over 2000 gallons of water per minute. One of these pumps in the ship should be connected with the ship's engine, to be used if the engine was all right; if not, let the donkey engine drive one or two pumps at full speed; if it only threw out 1000 gallons of water per minute it would have saved the *London*. This may be proved by the quantity of water in the ship, which sunk her. Then, I say, a third pump should be placed in all ships, to be worked by hand. I will suppose it to be a 10-inch pump, fixed with a good fly-wheel, this would throw out 1000 gallons per minute if well worked; if worked only sparingly or easy it would throw out 500 gallons per minute; this would keep the ship clear of sea shipped. I will pass the lazy sailors as useless men, and ask a watchful public if they think the *London*, with her noble passengers, headed. I say, by the brave comedian, would not have used this hand pump with their greatest efforts, and would have prevented the ship and themselves from going to the bottom of the Bay of Biscay? But few are aware of the effects of such a quantity of water to be removed at the rate of only 500 gallons per minute; if they had done this they would have saved themselves and the ship and cargo had they only kept the ship up for two hours longer there was a chance of some passing vessel picking them up.

It may be asked what is to be done with a fly-wheel on the deck of a ship? In answer I say, heave it down on the deck, and rig it up in quarter of an hour when wanted. To prove what I say on pumping and engines, let those interested go down to Greenwich and look at an engine there on four wheels, driving pumps by a belt, and throwing out 4000 gallons of water per minute from the main town drain, at a cost of 1s. per hour. An engine well constructed on a ship's deck is not only useful to prevent the ship from sinking, but in case of fire it can be used to subdue it, and to save the vessel from such calamity—that is if it were provided with proper gear. What sane man would send a good ship to sea without means to work a single pump, when such an engine as that at Greenwich can be had at 1s. per hour? I should recommend two donkey engines on the decks of every large ship, as these engines do all the heavy work of the ship.

No pump should ever be sent to sea driven by a belt, for so soon as the latter gets wet it stretches and becomes useless.—EDS.

Razors.

Engineers as a class were the first to head the modern "beard movement" in this country; but many may like to read the following extract from a little work by Mr. Kingsbury, a practical razor maker, of Bond street:—"The edge of a razor, a pen-knife, and every other very keen instrument, consists of a great number of minute points, commonly called teeth, which if the instrument is in itself good, and in good condition, follow each other through its whole extent with great order and closeness, and constitute by their unbroken regularity its excessive keenness. The edge of such an instrument acts on the beard, the skin or anything else, not so much by the direct application of weight or force as being drawn, even slightly, along it; because by this operation, the fine teeth of which it consists pass in quick succession, in the same direction, and over the same part of the substance. My readers will be convinced of this if they will make the following experiment on their glove or their hand, as they like best:—Let them hold the razor either perpendicularly or obliquely, and press on it with some considerable force in a direct line from right to left, and they will have no great reason to fear the consequences. But let them move it from that direction, let them draw it toward them, or push it from them, in the smallest degree, in the gentlest manner, and it will instantly make an incision. When they have made this experiment, they will be convinced of the truth of what I have asserted, namely, that in the operation of shaving, very little weight and even very little force are necessary." Hence it follows that the best razor will have the teeth of its edge set almost as regularly as a good saw, and that the best test in buying a razor is to examine the edge by means of a strong magnifying glass. This also explains the good effect on the keenness of a razor caused by dipping it in hot water, which necessarily clears the edges of any small clogging substances.—*London Engineer.*

Petroleum as Steam Fuel.

An important addition has just been made by Mr. C. J. Richardson to his petroleum boiler at Woolwich Dockyard—steam pipes have been so arranged that the waste steam may be conducted to the grate and burnt; it rises upward through the porous material, and flashes into flame at the surface. The effect of the steam is described as marvelous. Upon opening the furnace door the smoky flame of the coal oil is seen; then on the hot steam—for he first superheats it—being turned on, the flame in an instant is twice the size, the smoke disappears as if by magic, and a brilliant, white, active flame completely fills the fire place, fire boxes, and tubes. Mr. Richardson writes to us that "the chief fault in using petroleum as steam fuel is the smoke it makes; if badly used it makes smoke and soot in large quantities; sufficient to shame coal—our English oils do this worse than the natural petroleum. When steam is mixed with the vapor, the oxygen absorbs the superfluous carbon of the oil from a gas which burns along with the hydrogens. The hot steam is, however, a more powerful agent than I expected. It found out every faulty joint and screw of the petroleum troughs, and turned the oil out. The three first days my time was entirely taken up making good the mechanical defects."

[The use of steam in connection with burning petroleum oil is one of the peculiar features of Stevens's patent and system, an engraving of which was published in the SCIENTIFIC AMERICAN, Vol. XIV., page 12.—EDS.

RUBIDIUM has been discovered in coffee, tea, tobacco, grapes, and crude tartar. Coffee is richer in this metal than tobacco, but, as in the case with tea, yields no lithium. The spectrum analysis was the one used. No rubidium was found in cocoa or cane sugar.

ROCKPORT, Mass., has almost a monopoly in the manufacture of isinglass. It is made from the sounds of the fish called hake, and the business is very active during the winter months.

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Improved Caloric Engine.

From many parts of the country, correspondents are frequently writing to us requesting information on caloric engines and their adaptation to small manufactures. The engraving published herewith, represents the Ericsson caloric engine which has now been in practical use for many years, doing all kinds of work where only a moderate degree of power is required. The advantages arising from the use of such machines are that they are economical of fuel, use no water and can be worked by any one of common intelligence. They also warm the rooms in winter, thus saving the use of extra fuel for that purpose. They are entirely free from liability to explode and may be used on any floor of any building without increasing the rates of insurance. Many improvements suggested by a practical experience of ten years have been introduced, making them much more durable and efficient than when first offered to the public. For further particulars apply to the manufacturer whose advertisement is always to be found in our advertising columns. For a full account of what the engine is we quote from the report of an eminent consulting engineer who thoroughly investigated the subject for a firm in England who proposed to manufacture them He says:

"The plan of the caloric engine is good, as regards its fitness for obtaining power directly from the dry heat of incandescent fuel, being properly fortified against its effects. Its mechanical arrangement for transmitting this power is also excellent, the parts being well proportioned, and having the necessary provision for adjustment, and compensation for wear. The furnace, or heater, is a cast-iron chamber, and is within the cylinder, and being constantly exposed to the action of dry heat, it may be regarded as undergoing a gradual deterioration; it is accordingly so constructed that when unfit for use it can be expeditiously replaced with a new one. This operation, however, is by no means so frequent as might be supposed of a heater lasting from two to six years.

"The engine has a good machine-like appearance, and is principally composed of cast iron, the use of which material enables the manufacturer to get them up at a small cost.

"In determining the question of economy in the production of power by this machine, reference must be had to the steam engine, because in both, power is produced by the consumption of fuel, thus presenting for both a common measure of cost.

"But in addition to the matter of fuel, there are other considerations which should not be lost sight of in this comparison: Steam engines are exceedingly variable as to their economic results, being affected in this respect by a number of independent circumstances, such as the arrangement of the boilers and of the furnace, draft of chimney, proportion and set of the operating valves, etc. A great deal is also dependent upon the skill and faithfulness of the attendant. And it is in view of these circumstances that some steam engines cost twice as much as others to produce the same amount of power. It is also worthy of notice, as a well-established fact, that small steam engines consume more fuel accordingly than larger ones, while at the same time they require more care and manipulation to run them properly, especially in managing the boiler and watereed. The caloric engine is entirely free from all such difficulties, requiring no attention whatever after starting, except the occasional supply of fuel, and a little oil to the bearings and joints, while the speed is as regular as the vibrations of a pendulum.

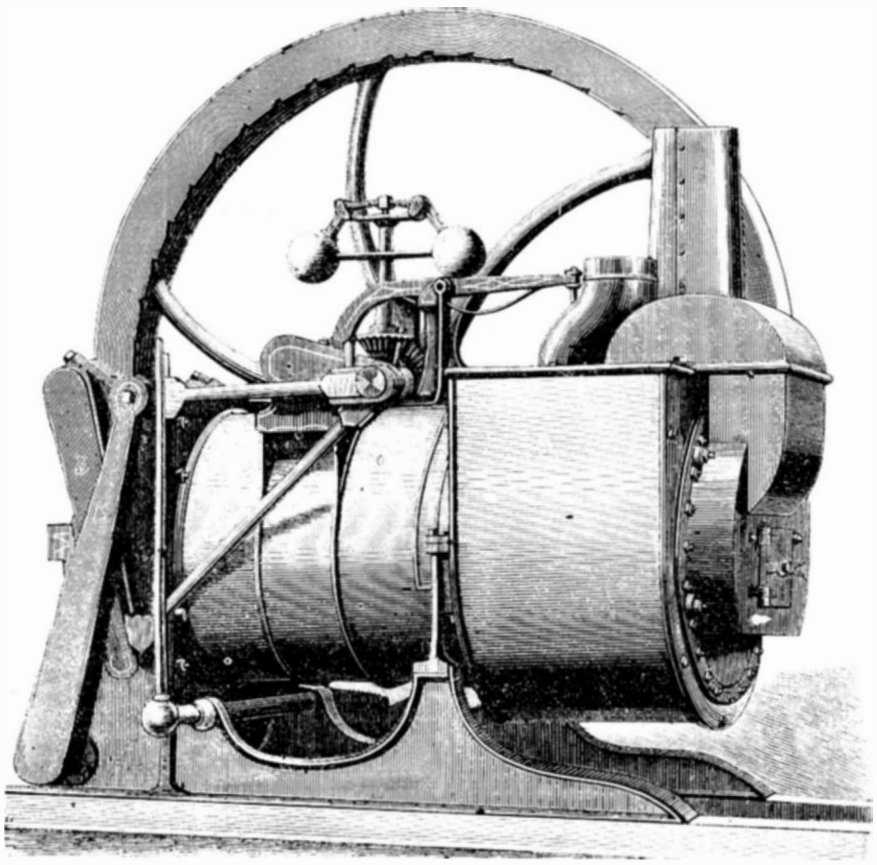
"I have examined a number of these caloric engines in operation, which were doing the work heretofore accomplished by small steam engines.

"They all gave complete satisfaction and apparently ample power for the purposes to which they were applied; but without experiment it is impossible to say what quantity of power they actually furnish respectively, but, judging by the appearance of things they all worked well and with surprising regularity evidently developing a much larger amount of power from a given quantity of coal than could be obtained from steam engines as at present constructed, of corresponding powers. And being such that they may be placed in any location from which a chimney may be reached, and not requiring water or skilled attendance, they are particularly desirable as a driving power for small manufacturers, who are thereby enabled to conduct their operations in the business parts of the cities, by occupying upper lofts.

"No attention is required for them while running, beyond what is necessary to throw in a few coals occasionally, which is all that is required to keep up a constant and uniform motion—which considerations become of importance to those who require a small power only.

"As to the appreciation of this machine by the public, it may well be said that whereas it was a few years ago looked upon as a mere mechanical curiosity, it is now regarded and acknowledged as a reliable motive power."

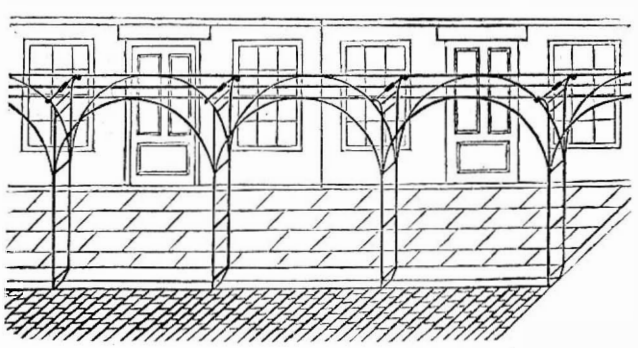
Address Jas. A. Robinson, 164 Duane street and 136 Reade street, New York, for further information.



ERICSSON'S CALORIC ENGINE.

ELEVATED RAILWAY FOR STREETS.

We present herewith an engraving of a suspended railroad, which we copy from Gillespie's "Manual of Road Making," published by A. S. Barnes & Co., No. 51 John street. The arrangement was suggested by the late Charles Ellett, Jr., in 1844, for an atmospheric railroad. Prof. Gillespie makes the following remarks:—

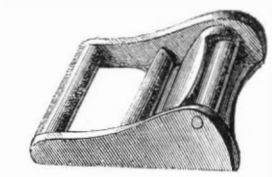


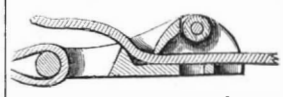
"A railroad worked by a stationary engine, would be the most convenient method of relieving the rush of travel through Broadway. The railroad track should be supported on iron columns, out of the way of carriages, as in the figure. These columns might be placed on the edges of the sidewalks, where now are the lamp and awning posts, and by extending over the gutter they would have a base of three feet. Their lower extremities should be set in heavy masses of masonry. At top they should spread outward, a foot on each side, which would give sufficient width for the railroad track. The columns should be set at distances of 15 or 20 feet, and connected by flat arches. There would be no flooring over the street, and the rails would intercept no more light than do the boards which now connect the awning posts. No locomotives, or even horses, would pass over the road; but an endless rope would continually run over pulleys, and light cars would be under the most perfect control, and could be attached to it, or disengaged, at will, and stopped more easily than an ordinary omnibus. At the upper end of Broadway, a stationary engine, or the water power of the Croton, would easily and cheaply keep up the circulation, which would pass up one side of the street and down the other. At each corner might be a platform, to which there would be a short flight of steps from the sidewalk, the ascent of which would be very easy; or a certain number of corner houses might be used as depots, so that passengers might step into the cars from their second story windows. As these cars would replace the omnibuses, the entire street would be left for miscellaneous travel."

FRYE'S BUCKLE

This buckle is one of that class which has no tongue, or rather no tongue which penetrates the strap, but in lieu of it a pawl or lever which holds the strap by jamming it between two contrasted openings.

Heretofore such buckles have been restricted to the use of straps of a certain thickness, otherwise they became inefficient. The inventor of this buckle claims that he has discovered a remedy for this trouble, and that straps of any thickness within reason can be used in it.





This is effected by making the pawl, A, of a different form from that commonly used. Instead of having the V-form it is made nearly flat, and is fitted with a short spur, B. This sticks into the strap and aids to draw the pawl to its seat, and also prevents any back movement from unbuckling it. No strain comes on the spur after the pawl is down to its seat. The entire patent is for sale.

A patent was procured on this invention through the Scientific American Patent Agency on Jan 23, 1866, by R. E. Frye; for further information address him at Manchester, N. H.

THE Chincha Islands do not exceed in extent two and a half square miles, yet for years past they have supplied guano to an average of four hundred ships per annum, the value of such cargoes in Europe being upward of £50,000.

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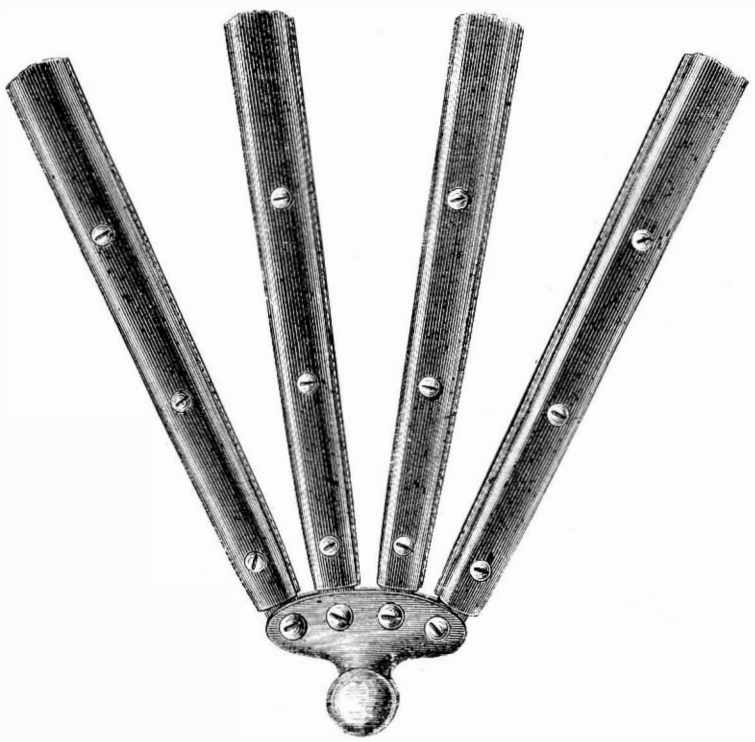
Improved Bow Iron.

The ordinary method of constructing carriage bows requires considerable skill, and takes a good deal of time to fit them all properly. Usually the bows are made of wrought or malleable iron, and the subject of this invention is to simplify as well as reduce the cost of construction.

The irons, shown covered with leather in the engraving, are received in a casting, A, which is for convenience formed of two pieces, or sides, fastened together, but it may be made of one single piece as well. The bows are made of stout hoop iron, and the ends inserted between the sides, A, and there secured by rivets. As one of the bows must be stationary, ribs are cast on one of the sides, A, which forms a sort of pocket in which the end of the bow is received; thus holding it in the proper position.

It is claimed that this plan of making the bow iron is much cheaper and better than the common one.

It was patented Jan. 16, 1866, by H. M. Bidwell, of New Haven, Ct., whom address for further information.



BIDWELL'S BOW IRON.

Photography on Silk

The following formula for printing on silk is one that, on the whole, has given me the greatest satisfaction, and is identical with the one published by me two years ago:—

Pour 20 ounces of boiling water on 100 grains of chloride of ammonium, and 60 grains of Iceland moss.

When nearly cold filter and immerse the silk in it for 15 minutes. To sensitize, immerse the silk in a 20-grain solution of nitrate of silver for 16 minutes. Let the nitrate bath be rather acid. When dry, prepare for printing by attaching the silk to a piece of cardboard a little smaller than itself, by turning the edges over and fastening with small bits of gummed paper. Slightly overprint. Wash in two or three changes of water, and tone in a gold bath made thus:—20 ounces of water, 2 drachms acetate of soda, 4 grains chloride of gold, and a few grains of common whiting. Filter and keep for 24 hours before using. Let the prints be toned slightly bluer than they are required to be when finished. Rinse them in water, and fix in a solution of hypo., 4 ounces to the pint of water. 20 minutes is ample time for fixing. Wash well.—*H. Cooper, Photographic News.*

White Enameled Plates for Photography.

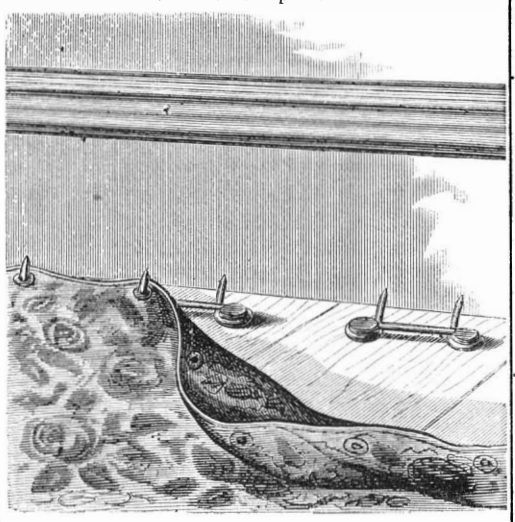
In a paper read before the Philadelphia Photographic Society by Mr. Wenderoth, he gives the following as the method by which he prepares white tablets for photographs. He coats the plate—a ferrotype or a glass plate—with a solution of albumen one ounce, water five ounces. He then adds to plain collodion so much fine precipitated chalk as will make a covering so thick as to prevent the plate from being seen through it. It should be poured on in the same manner as ordinary collodion, and care taken to prevent lines from being formed. Before coating, the collodion should be well shaken up, and then allowed to subside for a minute or two, to allow the heavy particles to fall to the bottom. When quite dry, coat with twelve parts of albumen and eight parts of water, adding two grains of chloride of ammonium to each ounce of the solution. Sensitize for one minute in a seventy-grain ammonia-nitrate of silver bath, then fume, print, and tone in the usual manner.

Stomatoscope.

Among other novelties noticed in the *Med. Times and Gaz.*, is "a new instrument, to be termed the *stomatoscope*, exhibited last week to the Paris Surgical Society by its inventer, Professor Burns, of Breslau. A platinum spiral were (inclosed in a box-wood cup, to prevent the transmission of heat), brought to a red heat by the passage of an electric current from two of Middeldorps' elements, is placed in the mouth behind the teeth. The light reflected by a very small mirror is sufficiently intense to render the jaw transparent, so as to allow of the vessel proceeding to the roots of the teeth, the smallest specks of caries, etc. becoming visible. By reason of the transparency, even the labial coronary artery may in some subjects be seen at the level of the commissure, and its course followed. The instrument is therefore likely to form a useful means of exploration in dental affections.

ANDREWS & BURNHAM'S CARPET FASTENING.

Tacking down carpets is an antiquated and bad practice which ought to be abolished. Both the carpets and the floors are injured, thereby, and in some dwellings that have been occupied for years the boards are iron-clad. Tacks are always difficult to remove, and are, in many ways, not necessary to dwell upon, a weariness and vexation of spirit.



The fastening here shown is designed to be permanent. When once affixed to the floor it remains there and the carpet is slipped over it. It would be a great improvement in this fixture to have eyelets in the carpet which would prevent the wires from holding on one or two threads. A tack holds not so much by its body as its drawing into the wood. Carpets so put down can be taken up easily, swept, and put down again without going through the great labor of drawing tacks. We have no doubt but that housekeepers will appreciate this invention.

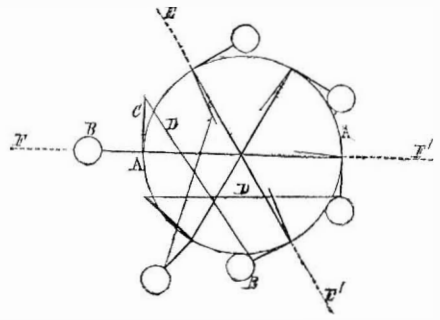
Patented August 29, 1865; address for further information J. P. Burnham, 1,159 Prairie avenue, Chicago, Ill.

Correspondence

Perpetual Motion.

Messrs. Editors:—The idea of perpetual motion is so fascinating to some that I am induced to throw a little light on one that has occupied a considerable attention—the one called Leache's, and exhibited along the Canada line. A friend of mine, Mr. B., saw it, and believed and invested in it. He examined every part and pronounced it a genuine "perpetual motion." He then without L.'s knowledge came to my shop and built a larger one with a 30-inch wheel.

I inclose a diagram and description of this wonder:—



A A represents the balance wheel; B the motive balls; C the angle irons connecting balls to the wheel and to each other; D D are the cords connecting the angle irons. D is represented only on part of the balls. It was supposed that the balls would fall out when at the point, E, but they would not until near the point, F. Now, when the balls, B, fall off from the rim of the wheel, they would, by aid of the cords, D, draw in the opposite ball, but it would not "come to time;" only two balls would remain out while four were in, and the wheel would not stir.

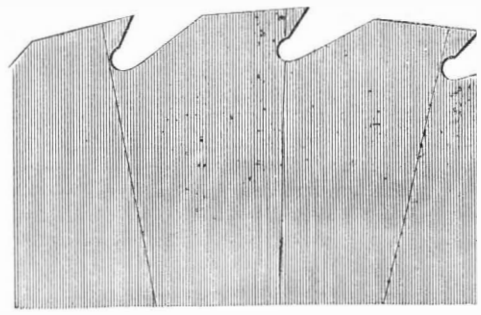
So much for this one; others compare favorably with it. S.

Brattleboro', Vt., April 27, 1866.

[This is one of the oldest forms of the delusion.—Eds.

Sawing Lumber.

Messrs. Editors:—In the Scientific American of March 31, page 212, I see an article from F. M. E., asking for information in regard to running circular saws. I have to say, that, first of all, the saw should run true on the mandrel, which is not always the case. The saw should range into the carriage half an inch in twenty feet. The mandrel should have nearly one-eighth of an inch end play. The guides should be one-sixteenth of an inch from the saw, or a little nearer, perhaps, in hard wood. The teeth should be



one inch and a quarter long, or deep, from the point. The under side of the tooth should range about eight inches from the center for hard wood, and ten inches for soft wood; or, if a large saw, twelve inches will not be too much.

I use a patent gummer, and cut out no more between the teeth than is necessary, leaving the tooth as strong as possible, as in the diagram. The top of the tooth should range one-fourth of an inch below the point of the next tooth back of it. I stand on the front side of the saw to file, and file all the teeth alike, nearly square across, but not quite, making the corners of the teeth on the side of the saw toward the carriage a trifle the shortest; this contracts the range of the saw into the carriage. When the teeth wear off on the side, pointed like a pegging awl, they must be swedged out or filed off and set again.

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I have sawed lumber so smooth that you could scarcely count the cuts of the saw on it; and the smallest feed I have is three-fourths of an inch to each revolution of the saw. It requires less set for hard wood than for soft.

Years of experience have taught me that this is the proper way to keep a saw in order to do good work, and I find no difficulty in doing good work in all kinds of timber.

I also noticed on page 245, at the close of the piece written by T. D. Lakin, you asked the following question: "What is the object of giving end play to the mandrel?" I will answer: To make it self-adjusting, so as to range, the same as the governor on a steam engine as to speed or motion. When the saw is in operation, and is running out at the log, the log will crowd against the center of the saw; this will push the mandrel endways, changing the range of the saw as the front part is held by the guides; this will cause the saw to run into the log again, and if it runs in too much the slab, board, or plank will crowd on the back side of the saw near the center and push the mandrel out toward the log; this will change the range of the saw out again. This is very essential.

I am glad that this subject is brought before the public in your valuable paper, hoping that a free interchange of views and opinions will lead to a better understanding in this branch of business, where so much skill is required to become a master.

I do not approve of the shape of the teeth as T. D. Lakin represents them; they are too hooking and too cross-cutting. I wonder at the proceeding of some sawyers. If they file an up and down saw, they will file it nearly square across, and about straight on the under side, not hooking in the least; but a circular saw they file beveling enough to cut stove wood, with twice as much hook as it should have. I know of no reason why the teeth on one kind of saw should be different from those of another, when they are designed for the same kind of business. I am satisfied that saw teeth after the pattern I sent you will prove highly beneficial when they are thoroughly tested.

J. W. Churchill.

Pittston, Pa., *April 9, 1866.*

Cure for Cholera.

Messrs. Editors:—I send to you below the recipe of the Liverpool Dock Committee of 1849, for the cure of cholera. It was shown that 157 men of the north works, and 93 men at the dock yards who had been attacked by diarrhea or cholera, had taken the medicine prescribed, and the whole of them had recovered. Ten men of the north works, and thirteen at the dock yards, similarly attacked, but who had not taken the medicine, had died. In not a single case had the prescription failed.

Recipe for Diarrhea and Cholera.—Three drachms of spirits of camphor; three drachms of laudanum; three drachms of oil of turpentine; thirty drops of oil of peppermint.

Mix, and take a teaspoonful in a glass of weak brandy and water for diarrhea, and a tablespoonful in weak brandy and water for cholera.

Lose no time in sending for medical attendance when attacked, and inform the doctor of what has been taken.

Medical men assert, and experience shows, that this is an excellent remedy and well worth being kept on hand by every family. W. W. Hubbell.

Philadelphia, April 28, 1866.

Visibility of Steam.

Messrs Editors:—Will you, for the benefit of a certain party, answer the following question: Whether the vapor that a person can see coming out of an exhaust pipe from a steam boiler is, properly speaking, called steam? Lorenzo D. Redfield.

New Haven, April 30, 1866.

[Steam is the vapor of water; that seen coming out of the exhaust of a steam engine is steam, commonly speaking. Steam under pressure, confined, is invisible, and can only be seen when mixed with atmospheric air.—Eds.

Board Measure.

Messrs. Editors:—I find that there is considerable difference in the manner of reckoning the number of feet, inch-board measure, which a log will contain. In most of the books or tables the compilers have put down the number of boards which can be sawed from a log, allowing for saw cuts as well as slabbing; but none that I have seen give the number of feet, allowing only for a fair deduction for slabbing.

I have worked it in this manner. Multiply the diameter of the log by 3, divide this product by 4, then multiply the quotient by the length of the log, and the product will be the number of feet, board measure. For example, suppose a log measures 16 feet long by 12 inches through, $12\times3=36\div4=9\times16$ feet=144 feet.

I have found out a very simple plan to avoid reckoning even as much as this. Take a lumberman's rod which he uses in finding the contents of boards, use the side of it which is marked as the same length as the log, lay the rod across the diameter of the log, and whatever the rod calls for in board measure, multiply by 9 and the result will be exactly the same as I have reckoned it, above.

Heber Wells.

Paterson, N. J., May 1, 1866.

Hardening Dies.

Messrs. Editors:—In the Scientifc American of April 28th, James Ayres desires information on tempering a die so that it will not crack on the edge. The reasons given by you, undoubtedly, have something to do towards causing the edges to crack; but there are other reasons. In the first place, the steel chosen may not be suitable for that purpose; again, in forging, most likely the smith cuts off a piece one inch and one-half from a two-inch bar, about what he thinks will do. He makes it that, and flattens it to an inch, then holds it on the edge of the anvil, and by repeated heating and hammering reduces the edge to the proper thinkness. In doing so I presume the edge of the die was frequently bent back and forth when cold, perhaps nearly broken, and afterwards strained in hardening. Every blow struck on steel after it is past a red heat, is an injury to it, no matter for what purpose it is used. Many mechanics pound away on a chisel or a turning tool until nearly stone cold. When the tool breaks or is not satisfactory (which is sure to be the case), then the steel is bad, or not tempered good, when it is the forging, and nothing else. Perhaps Mr. Ayres makes his die too hot, and yet not uniformly so. If I had a die of the description given, to temper, I would keep it as cool as possible on the edges, unless I used the edge for cutting purposes. Then I should make the edge hot by not leaving it long in the fire. When dipped in water it should not be taken out until cold, as the edge cools first, and consequently shrinks from the outer edge (that being hard), and the heavier part hot when taken from the water. The expansion of the middle causes the outside to give way, as the heat travels back. You are right, Messrs. Editors, when you say cold water is as good as anything to temper in; you might say the *best* thing. All this humbugging about composition baths, and things of that sort ought to be (and is by some) classed with Salem witchcraft. Some years ago I made pistol work. When I commenced, the boss said the man who did the work before me annealed it in a cast-iron box, and thereby spoiled it. Some mysterious agency passed from the cast iron through the charcoal dust and entered the steel, and thereby converted it to cast iron. I said to my employer, I could remedy all that, and did. I hung up a horse shoe over the door. Of course, I simply did not burn the steel. P. McCormick.

Newark, N. J., April 30th, 1866.

[There are some who will differ with Mr. McCormick about hammering steel nearly cold. We will for one. We have never had better cutting tools than those hammered well at a black heat and tempered properly. If a die or other tool is put in the water and held at one point until it is half black and half red, it will in most cases crack at the water line. It naturally does so because it is pulled asunder from the effect of contraction drawing one way and expansion urging in another. The proper way is to keep the article moving slightly until it is cool enough.—Eds.

Tax on Inventors.

Messrs. Editors:—I see by the report, that on a motion of Mr. Jenckes, of R. I., the House of Representatives at Washington has passed a bill imposing a fine of ten dollars for an appeal from the primary Examiners in the Patent Office to the Board of Appeals. I hope this bill will not pass the Senate.

Inventors have to pay fees enough now, but to be obliged to pay a fine of ten dollars for the want of brains or a want of appreciation in a primary Examiner, is rather too bad. The Patent Office is the inventor's trustee; it is making money; it is abundantly able to employ competent talent, and to afford every facility to its *cestui qui trusts*, in obtaining what the law says they ought to have. To put on additional burdens now, argues a want of any proper consideration of the duties and responsibilities of the Office. I suppose it is merely to get rid of trouble. It is their business to take trouble. That is what they are paid for, and that is what the law intends; but to add to the burdens of inventors, only to diminish the burdens of lazy or incompetent Examiners, is simply abominable. An Inventor.

Boston, May 3, 1866.

Hot and Cold Solutions.

Messrs. Editors:—"F. T. E." asks why salt does not dissolve in hot water in larger quantities than in cold. The simplest answer to such questions is, that it is its nature; and chemistry obeys its laws as rigidly as nature obeys hers.

Different salts have different points of solution; an instance of the vast difference in the behaviour of certain salts in hot and cold water is that of one of the alkaline salts of which 60 parts are soluble in 100 parts of water at a temperature of 57°, at 97° 833 parts are dissolved, while at 219° (the boiling point), only 445 parts are in solution. Again, the sulphate of lime is sparingly soluble, requiring 400 parts of water to one for its solution above the boiling point; its solubility rapidly decreases, until at 300° it is totally insoluble; hence the large amounts of calcareous deposits in, and so destructive to, steam boilers. H. H. W.

New York, April 27, 1866.

The Metrical System--A Farmer's Experience.

Messrs. Editors:—In your issue of March 31st, a correspondent seems to be afflicted at the prospect of the introduction of a rational and enlightened system of weighing and measuring. Out West a farmer carried a load of wheat to the railway depot, and sold it for $1 50 per bushel. The load weighed 2,230 lbs. The clerk, after some calculation, says, "You have 36 bushels and 10 lbs." The farmer demurred; it then came out 37 bushels and 10 lbs. The farmer next took a load of oats into the city, and sold them at 50 cents to feed a banker's horse. They were weighed on the city scales; the check was delivered in the bank to a man who had a gray hair here and there. After a little legerdemain, he said, "You have 34 bushels and 20 lbs.;" the farmer demurred; the calculations were gone over again, when a mistake of one in the column of hundreds was discovered equal to 3 bushels and 4 lbs. Again the farmer carried wheat to the depot; the accountant made a mistake of 30 cents in figuring up the price of the odd pounds, which often give more trouble than all the rest of the load. When challenged, he said it would take a school teacher to make the calculations.

They are some of the vestiges of slavery, and when our teachers become learned enough to know how to exercise themselves to keep their consciences void of offence and not to offend one of the little ones by unsearonable services, our absurd system will cease to exist in the land. J. E.

Verona, Wis., April 20, 1866.

A Bill to Fine Inventors for Appealing from one Set of Examiners to another Set.

Messrs. Editors:—I see that the House of Representatives has passed a bill adding ten dollars to each case appealed to the Board of Examiners-in-Chief in the Patent Office.

Now, I am very sure that if Congress understood the facts in the cass, they would not add this unnecessary burden to the difficulties of inventors. When this Board was established in 1861, the same law that established it, added five dollars to the fees to be paid in every case filed, whether appealed or not. This was done for the very purpose of paying the increased expenses of the Office, in consequence of the creation of the Board, and the increase of salary of the Commissioner, Chief Clerk and Librarian.

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There were filed last year about ten thousand applications, the increased fee on which paid, of course, *fifty thousand dollars*. The whole expense of the Board and increase of salaries was but a trifle over twelve thousand dollars. It will thus be seen, that the inventors have already paid four times the increase in the expense to the Office. Not only this: under the operation of the law as it now stands, the Office has accumulated, within the past two years, a surplus fund of nearly *one hundred and fifty thousand dollars!* What reason, then, is there why this addition of $10 should be made to the fees? There is no good reason whatever; and for one I enter my protest against it, and call on the Senate to protect us from this wrong. AN INVENTOR.

New York, May 4, 1866.

Bills Concerning Patentees.

On the 2d of May, the following bills were reported in the House of Representatives:—

THE PATENT OFFICE AND PARIS EXHIBITION.

The regular order of business, being the call of committees for reports, was then taken up.

Mr. Jenckes from the Committee on Patents, reported a bill providing that upon appealing the first time from the decision of primary Examiners to the Examiner-in-Chief in the Patent Office, the applicant shall pay a fee of ten dollars.

The bill was considered and passed.

Mr. Jenckes, from the same Committee, also reported a bill to give increased pay to the Examiners and Assistant Examiners of Patents, from April, 1861, to August, 1865.

Mr. Washburne, of Illinois, required an explanation, which brought out the fact that the bill was to pay certain clerks for performing the duties of a higher grade.

Mr. Harding, of Illinois, compared it to an effort to pay colonels who act as brigadier-generals the pay of the higher rank, and moved to lay the bill on table.

The motion was agreed to.

Mr. Chanler from the same Committee, reported a joint resolution authorizing the Secretary of the Interior to appoint three Commissioners to examine and report on the patented machinery and inventions that may be exhibited at the Paris Exhibition of 1867, with power to employ the necessary draughtsmen and photographers, the expenses not to exceed fifteen thousand dollars.

Mr. Washburne, of Illinois, opposed the joint resolution, arguing that there was no necessity for it, and that it was only an attempt to draw money out of the Treasury to pay the expenses of three high-flown and elegant gentlemen who wished to visit Paris in 1867.

Mr. Boutwell stated that it was the rule in foreign countries to send to the Patent Office drawings of patents issued there, at a very trifling expense.

Mr. Chanler admitted that was so, but said there was considerable delay in sending drawings, and that this was a question of time. Drawings of patents were sometimes not received for three years.

Considerable debate ensued, after which on motion of Mr. Stevens, the joint resolution was laid on the table.

TYLER COTTON PRESS PATENT.

Mr. Hubbard, Connecticut, from the same Committee, reported a bill for the relief Philos B. Tyler, looking to the extension of his patent for an improvement in cotton presses, the same as though the patent had not been already extended.

The bill was opposed by Messrs. Upson and Washburne, of Illinois, and supported by Messrs. Hubbard, of Connecticut, Dawes and Broomall; the debate showing that the patent had been enjoyed for fourteen years, and that the patentee had received over $23,000 for his invention.

Mr. Washburne, of Illinois, moved to lay the bill on the table. The vote resulted: yeas, 68; nays, 59.

So the bill was laid on the table.

NEW INVENTIONS.

Hermetically Sealing Fruit Cans and other Vessels.—This invention relates to a new and improved mode of "hermetically sealing" cans, jars, or other vessels in which fruits, vegetables, meats, milk or other articles of food or other substances are placed, or the purpose of being preserved from decomposition or decay, and it consists in placing the vessel containing the fruit or other article of food or other substance which it is desired to preserve, within any air-tight chamber or receiver, from which the air, as well as that of the vessel containing the fruit, etc., is exhausted by means of an air pump, to the proper or requisite degree, producing a vacuum, or partially so, therein, and then hermetically sealing, in any proper manner, the vessel containing the fruit, etc, while in such vacuum, when the vacuum being destroyed, the vessel so sealed is removed from the chamber in which it was placed and its contents either or not subjected to the action of heat in any of the ordinary modes now practiced therefor, according as may be desired or deemed best. W. K. Lewis and J. W. Bailey, of Boston, Mass., are the inventors.

Centrifugal Governors for Steam Engines.—In this invention the balls are arranged so as to swing in planes, not radial to the center as hitherto, but at an angle of 45 degrees, or nearly so, whereby all the forces are economized and made to act in unison with each other. The swing of the balls is similar to that of a pendulum, their movement being in harmony with the motion of the governor, and not in planes across and antagonistic to it, as is now the case, with the ordinary centrifugal governors. By this means, the inertia in conjunction with the centrifugal forces causes the balls to fall to the rear of the point of suspension, thus acting to close the valve, while the momentum and *dead* weight are equally free to gain upon the point of suspension to open the valve. The great defect in hanging the balls so as to swing in radial lines from the shaft is that they are forced to retain their positions relative to the points of suspension, though at every variation is the speed of the engine the balls have a tendency to change such position with regard to the governor shaft, that is to advance or to fall to the rear of their points of suspension, but as the radial mode of suspension will not permit it, a force is consequently lost, which if economized, as it is in this invention, would be quick and effective in operation, but as it is so checked, a "jam" or straining and binding of the joints is produced, that greatly obstructs and prevents the free action of the little force remaining. David Shive, of Philadelphia, is the inventor.

Printing Press.—This invention relates to a new and improved printing press for printing both sides of a sheet simultaneously or during one passage of the latter through the press. The invention consists in a novel and improved means employed for operating the platens and in an improved inking and feeding mechanism; nearly all the parts being made to operate automatically from a single driving shaft, the necessary dwells allowed the platens to give the ink rollers an opportunity to pass over the forms, after each impression, and the feed mechanism made to work intermittently, or during the time only that the forms are free from or not in contact with the beds. The object of this invention is to obtain a simple and economical press for the purpose specified, and which will operate smoothly and well, and not be liable to get out of repair or have its parts become deranged by use. Martin G. Imbach, New York City, is the inventor.

Burial Cases.—This invention relates to a further improvement in coffins to that for which a patent was issued to Mr. Fogg on the 6th day of February, 1866, the said improvement being made applicable to a straight-sided coffin or burial casket, whose lid is secured by hinges or the like, to one edge of the case, and opening so as to display the whole interior of the casket. The present invention consists in removing a piece from nearly the whole of one side of the casket, which piece is secured to the lid—which latter opens like an ordinary trunk or hinged box lid. Julian A. Fogg, Salem, Mass., is the inventor.

Locks.—This invention relates to a lock which is locked and unlocked by means of a key with a hinged bit. This key is introduced through a tubular key hole which revolves in a socket in the back plate, and to the inner side of which a disk is attached which carries a guard for the purpose of tilting the bit of key as the same emerges from the inner end of the key hole, and which also carries a nose for the purpose of pushing back the bolt or latch. Said disk is held in position and prevented from turning spontaneously, or from being turned with another instrument besides the key, by one or more tumblers, which are adjusted by the bit of the key when the lock is to be unlocked. Charles Claude, 96 Walker street, New York City, is the inventor.

Apparatus for Elevating Water.—The object of this invention is to raise water by the action of the waves. It consists in a floating vessel or buoy, having a large area of surface placed in the water along a coast where the waves and swell will have free access to it, the vessel having an open tube fixed in its bottom, which tube is carried upward within a large tube, which is connected with a reservoir fixed above the waves, or with a pipe that is conducted into a reservoir on the shore. Each of these tubes is provided with a check valve to prevent the return of the water. The patentee calls this invention a buoy pump. It will be useful in supplying water for driving a water wheel or other purposes, and can be applied at any coast where there is a continual swell of the water and where there are waves. The floating vessel is guided within a frame or by means of the standards which support the upper tube or reservoir. A. N. Shattuck, San Francisco, Cal., is the inventor.

Head Block for Saw Mills.—This invention consists first in a novel and improved manner of operating the uprights or knee pieces of the head block, whereby the same may be moved a comparatively long distance under the short movement of the operating lever. The invention consists, second, in having the shaft by which the uprights or knee pieces are driven forward in sections and connected by clutches, so that one or more of the uprights or knee pieces may be moved as occasion may require. The invention consists, third, in an improved means of graduating the set of the log to the saw, and, fourth, in an improved mode of dogging the log to the uprights or knee pieces. J. M Stanton and F. Stanton, Manchester, Hillsborough Co., N. H., is the inventor.

Clock and Watch Escapement.—This invention relates to escapements of clocks and watches, and consists in constructing the pallet in two parts, each mounted in a different axis, and pointing in the same direction, their faces moving in parallel arcs. They are connected to each other by means of arms fixed on their axis and extending toward each other, their ends being united to form a point, whereby the motion of each pallet is regulated and controlled by the other. The invention further consists in making the escape wheel take hold of the pallets on the inside of their faces, and work outward from their centers of motion, the power increasing as the escape wheel moves until it leaves the pallets, whereas in the old escapement the escape wheel takes hold on the outside of the acting face of one of the pallets, the power consequently diminishing until it leaves the pallet. Benjamin Bacon, Morrison, Whiteside Co., Ill., is the inventor.

NEW PUBLICATIONS.

GENERAL NOTICES OF CHEMISTRY.—By Edmund C. Evans, M.D.—Published by Lippincott of Phildelphia.

This is the title of a work of over 400 pages, translated from the French of Pelinge Fremy. It is, as its title and preface, by its author, indicat, intended for "persons, who unaccustomed to scientific studies, wish to acquire a general knowledge of chemistry and its principal applications."

"Among the numerous facts which compose this science, we have chosen those which recommend themselves by their importance in the arts; these we have attempted to make clear by freeing them from formulas and details purely scientific which we have given in other weeks."

There are but few persons who received their education forty years ago who have any knowledge of chemistry; lawyers, clergymen, retired merchants, farmers and the general reader can from this work acquire a general knowledge of chemistry without puzzling their brains over symbols and formulas, which to those ignorant of chemistry seem like algebraic problems.

THERE are seventeen manufactories of paper collars in New England, and each girl employed makes about one thousand of them daily.

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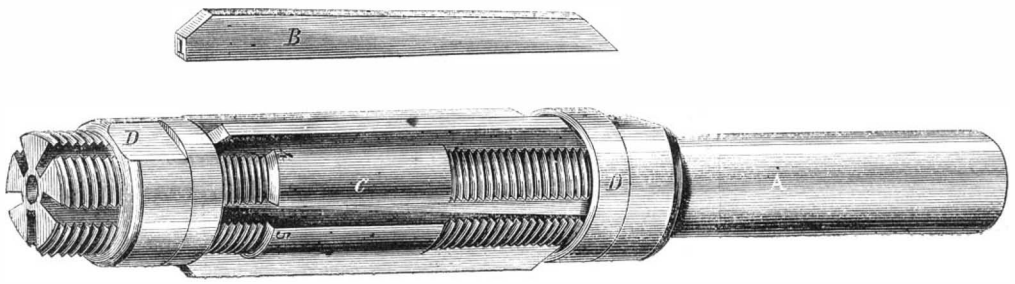
Improved Expanding Mandrel.

Every machinist must at some time have found trouble with the ordinary mandrels in use. Not only with mandrels, but with taps, rimmers, and similar tools. It often happens in shops where much repairing is done, as on railroads, that a great deal might be saved if the thread of a tapped hole could be made a little larger, when worn, instead of making it an eighth bigger, as is the usual plan in the absence of anything better for the purpose. The same remark applies to rimmers and boring tools; if the rimmer could cut a *little* larger the hole could be made round. And so on through a great many incidental cases within the experience of all.



CRITCHLEY'S EXPANDING MANDREL.

The subject of the present illustration is a tool that supplies the want in question. In detail, it is an arbor, A, having any number of grooves, five in the present instance—fitted with keys, cutters, or expanding tools, B, according to the nature of the work or office of the tool.

A screw thread is cut on the body of the mandrel, and a portion of it is left in the center, as at C, to strengthen and prevent springing. The cutters are beveled at each end, and confined in their places by nuts, D, so that it is only necessary to slacken them off and slide the cutters down in the tapered grooves to expand or counteract their outside diameters, and thus adapt them to all kinds of work. This can readily be made a most useful implement, as before stated.

It was patented through the Scientific American Patent Agency Dec. 19, 1865, by John Critchley, of Portsmouth, N. H. For further information address him at that place.

St. Elmo's Fire.

On the morning of the 7th of last month the curious phenomenon known as "St. Elmo's fire, was observed in the Irish Channel, by Captain Briggs, of the steamer *Talbot*. About one o'clock A. M. on that day the *Talbot* fell in, off the Isle of Man, with a heavy snow storm, which lasted three hours, during nearly the whole of which time from each mast head of the vessel, and also from each gaff end, a beautiful blue light was seen to proceed. During a part of the time a similar light proceeded from the stem head, and this light, being in an accessible position, was closely examined by Captain Briggs. "I found," he says, "that the light which appeared large at a distance, was made up of a number of jets, each of which expanded to the size of half-a-crown, appeared of a beautiful violet color, and made a slight hissing noise. Placing my hand in contact with one of the jets, a sensible warmth was felt, and three jets attached themselves to as many fingers, but I could observe no smell whatever. The jets were not permanent, but sometimes went out, returning again when the snow was heaviest. This was from one to three A. M. At daylight I carefully examined the place, but no discoloration of the paint was to be seen. The stem in this part is wood, with iron plates bolted on each side, and it appeared to me that the jets came out between the wood and the iron. The barometer stood at 29·1 inch. The ship is an iron one, but I did not observe any alteration or other effect upon the compasses. I have seen the same phenomenon abroad, but never before in these latitudes." Professor Frankland, of the Royal Institution, who has communicated Captain Briggs's account to the *Philosophical Magazine*, mentions that a thunder storm passed over Cheshire on the evening of the 6th, and points out that the brisk discharge seen by Captain Briggs to issue from various parts of his ship indicates a negative charge either in the surrounding atmosphere or in the snow flakes which were falling so thickly at the time.—*Mechanics' Magazine.*

INCREASED TAX UPON INVENTORS.

The Commissioner of Patents in his Annual Report to Congress, recommended an amendment to the law, providing that upon all appeals from the primary Examiners to the Examiners-in-Chief, that a fee of $10 be required of the appellant. The Committee on Patents reported to the House a bill based upon the Commissioner's recommendation, which was considered and passed. On January 1, 1866, there were over $130,000 surplus to the credit of the patent fund, which has been extracted from the pockets of inventors. There is, therefore, no good reason why this extra tax should be put upon this useful class of our citizens for the right to appeal.

Applicants for patents now pay enough for their privileges. We hope, therefore, that the Senate Committee will report against the House bill.

The measure is uncalled for, and we consider it unjust. If the Patent Office was running behind in its expenditures, then there would be some reason for the proposed bill. Instead of this, the surplus to the patent fund is constantly increasing.

BROWN'S SELF-CLOSING GOVERNOR.

When governor belts become unlaced and slip off the pulley, the engine runs away, and in a short time

gets up such a velocity as to greatly injure the work and machines. It is desirable to avoid such disasters, and the simplest and most direct agent for the purpose is the best.

The one here shown is the essence of simplicity The plan consists in making the bearing, A, the driving shaft, B, runs in, movable horizontally on the frame, C. When at work, the tension of the belt holds the pulley, shaft, and valve in the chest, D, below, in their proper position for driving the balls, and for supplying steam to the cylinder; but so soon as the belt slips off the bearing, A, is thrown around by the spring, E, acting on it, turning the valve in the chest by a square, F, formed on it at the top, so that the openings through which it receives steam are closed, stopping the engine directly. The valve can be set so as to close only partially instead of wholly, and thus maintain a moderate speed on the engine. These governors can be quickly applied to any engine, old or new, and will prove very satisfactory. Rights for Western and Pacific States for sale.

For further information address Messrs. A. & F. Brown & Co., Nos. 57 to 61 Lewis street, New York.

EXPERIMENTS WITH NITRO-GLYCERIN OR BLASTING OIL.

On the afternoon of the 5th, Mr. Nobel, the Swedish engineer and inventor, who has now become famous in connection with nitro-glycerin, conducted a series of experiments at Nolte's quarry, on Eighty-third street in this city, with the design of showing that his blasting oil is not so dangerous as it is reputed to be. The gentlemen present, about twenty in number, appeared to be pretty well satisfied with the demonstrations, and several of them who had had previous experience on the subject, seemed to fully indorse Mr. Nobel's statements. At the end of the experiments there was no fear of being near the oil, and the packages were freely handled by some who at the beginning were careful to keep at a very respectful distance; it reminded one of the ancient fable of the fox and the lion.

The experiments were as follows:—A small quantity of the oil was poured upon a flat piece of iron and struck with a hammer. A sharp explosion was the consequence, but an examination showed that only the oil directly under the face of the hammer was consumed. A small vial of the oil was packed with dust saturated with an inflammable substance, in small wooden box. The saw dust was set on fire by means of a fuse, and in a few moments the oil exploded, with a loud report, and the box was apparently annihilated. A lighted match was applied to a small quantity of the oil, and it appeared that in that way it could not be exploded. Wood naphtha (methylic alcohol) was dissolved in the oil, and it was shown that neither by heat nor by percussion could the mixture be exploded. When the mixture was washed with water, the naphtha was thereby separated, and the oil resumed its ordinary explosive properties. The concluding experiments were to illustrate the practical use of the oil in blasting.

The experiments lasted about two hours, no accident occured, and all passed off very smoothly, with the exception of the final tests, where there was some delay on account of the attempt to use fuses which were not properly prepared for burning under water.

We understand that the experiments are shortly to be repeated and on a larger scale.

MR. BECKWITH, Commissioner for the United States to the Paris Exposition, writes to Secretary Seward that there are as many assistant commissioners with him as he wants, and that persons really desirous of assisting the United States exhibition at that great fair can do so best at home.

STARCH PASTE.—This paste is often used by photographers for mounting their prints; but it is very apt to turn sour and moldy after keeping for a short time. If a little alcohol be mixed with the starch immediately after it has been dissolved, fermentation will be prevented, and the starch will keep good for a long time.

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WHISTLES AS SIGNALS ON TRAINS.

One of the most extraordinary things to an American is the mystery and difficulty they make in England about communicating between the engineer and passengers on a railway train. In this country, as our readers well know, the cars are one large apartment on wheels, but in England they are different, being like several stage coaches coupled together, each car consisting of three or more compartments. This affords special facilities to murderers and other agreeable persons who are not slow to take advantage of them, as criminal records show. All sorts of ingenious and impracticable schemes have been devised to communicate between the engineer and conductor or "guard," as he is called, but the simplest and most effective has not been tried, or if tried, meets with little favor. That is, the plan in vogue here, consisting of a bell and a cord which runs the whole length of the train and to be found on every railroad in our land.

It must not be supposed that this plan is not tried because it is unknown, but it is left unessayed for some reasons not stated. Whether the passengers would ring the bell "for fun," or whether the murderers, if left alone, would steal the rope, does not appear; it is sufficient to know that British ingenuity has not as yet solved the problem of communicating between the engineer of a train and the passengers on it.

The latest proposition is that the engineer should be signalled by sound. To make the sound the inventor uses compressed air and a whistle. He compresses the air with a pair of bellows and he places the whistle in front of "a reflector" (which is probably a *de*flector) to throw the sound forward; the whistle machinery being in the guard's "van." This van, a curious misnomer, is in the rear, being 300 feet from the engineer.

At a recent experiment with this machine (the speed of the train was about thirty miles an hour) the engineer heard the sound with difficulty on the foot board of the engine, although the whistles employed were four inches in diameter and were heard distinctly two miles in the rear.

Of course they were; that was the place to hear them. The *Engineer* says: "On the foot plate we heard the whistle very distinctly while the speed did not exceed 25 miles per hour, but in the open country at higher speed it became indistinct, though never totally lost. In cuttings it was at all times heard plainly, but the position of the hearer exerted considerable influence; thus when standing under the lee of the fire-box, which was large and high, it could be plainly heard, while it was inaudible to the engineer looking out." We are also further told that this apparatus is simple and not liable to get out of order and it may yet take the place of the ordinary signal cord. That is in England.

THE RIGHT KIND OF A GROCERY.

The old proverb says, "one cannot eat their cake and have it," but there seems to be a doubt whether this is literally true. That it is only partially so is daily proved at a certain store in this city. Some good and thoughtful men of the Novelty Iron Works, deeming the principle of a mutual benefit society good as applied to a grocery store, have opened one at the corner of Twelfth street and Dry Dock street, where they sell provisions to men employed at the Novelty Works only.

Last Tuesday we went into this store, and it was pleasant to see the neatness and order which prevailed. Everything was clean and wholesome, and the stock was palpably of the best quality. This scheme is very different from such affairs in general. Usually individuals are called upon to take stock in such enterprises to the extent they may deem an advantage. The concern is then embarked in business, with as much risk and interference from competition as any other, while the chances of its decline and fall are greater, for each individual stockholder thinks he of all others is the man to lead it up to profit and renown, when in all probability he is specially unfit. The consequences are disgust on the part of others, and a total collapse in a few months. The failure of co-operation is then pointed out by its opponents, and every one who entertains the idea subsequently is confronted with this precedent.

The Novelty Iron Works grocery store is quite another thing. No one takes any stock in it, at least not the parties chiefly interested. The object, says the circular before us, is to buy at wholesale, articles of food needed in families, and to sell only to men employed at the Novelty Iron Works, in small quantities at retail prices.

The difference between the cost (including expenses) of articles sold, and amount received from sales will be the saving or profit. This saving or profit will be entirely the property of the purchasers, and once in three months will be divided in cash among the purchasers in proportion to the amount of purchases by each man.

Each man wishing to make his purchases in this way will write his name and number on an envelope, which can be had of the gate keeper on Avenue D.

The amount of money he wishes to trade out must be put in the envelope in even dollars.

These envelopes with the money in, are to be put in a box to be found at each gate at Avenue D.

A pass book will then be sent to each man with his amount entered in his book. This book will then be good at this store until the money is used up. The pass book will have printed directions on the inside cover.

Care will be taken that all weights and measures are correct.

It will be seen from this that if the business is properly conducted by the managers, they will succeed, and that in any event the workman loses nothing, for he gets the market value of his dollar at the time of purchase. Thus it is that the cake is eaten and part of it saved, for if a man buys a loaf of bread only, at the end of three months he gets his *pro rata* profit on it, and we all know that half a loaf is better than no bread. Further, the more money a man lays out at this grocery, the larger his dividend will be; therefore the largest eaters make the most money.

If this logic is defective it is the fault of the benevolent founders of this scheme, for it follows from the facts.

It is needless for us to say that it has our hearty good wishes; therefore we won't say so, but it is very clear that the cost of living can in this way be reduced to the lowest point.

In all large manufacturing towns a plan like this well managed would be inestimable, and they are wise who take advantage of it.

ANOTHER TAX ON GENIUS.

We publish on another page a letter from an inventor who takes exceptions to the bill before Congress requiring the Commissioner of Patents to exact a fee of ten dollars in all rejected cases, before an appeal can be made to the Appeal Board.

We do not fully concur with the writer in the implication that the Examiners are lazy or incompetent; but every one who does business at the Patent Office knows that a great many erroneous decisions are made by the Examiners, and it was to remedy this evil that the Appeal Board was created, and much good has resulted from it. The number of decisions which this Board reverses is most convincing evidence that it is vitally important to inventors that it be continued; but we cannot see why the inventor should be taxed an extra fee for its support, when it was created for the primal object of correcting the Office's own errors, by reviewing the decisions of those Examiners to whose opinions an inventor might take exceptions.

The Appeal Board is constituted of intelligent scientific gentlemen, and has the power of vastly benefiting the inventor; but the receipts of the Patent Office are more than adequate to meet its expenditures, and we think it not only inexpedient, but unjust to inventors to impose a further tax upon them.

We concur with our coreespondent in hoping that the bill will not become a law.

SODIUM AMALGAM.

Sodium amalgam has been pretty well known for about sixty years. Several distinguished chemists, among whom was Sir Humphrey Davy, at the beginning of this century, busied themselves with studying it, and it was reasonably supposed that nothing of importance would be added to what they taught us of its properties. Yet the fact is that quite recently we have learned something about sodium amalgam that is practically worth more than all that we previously knew. It will now be taken out of the old curiosity shop and put in the market place; instead of being only a source of amusement and instruction to beginners in chemistry, it will minister to one of the strongest desires of men.

Sodium and mercury being both metals, have a wonderful affinity for each other. When they are brought together, there is a grand clash of atoms, so Prof. Tyndall would express it, and there is smoke and loud sounds, and flame, and intense heat; the experiment is a dangerous one, unless made on a very small scale. When the sodium amalgam is brought into contact with almost any metallic salt, the sodium seizes the oxygen, chlorine, or sulphur, and the mercury lays hold of the metal; in this way amalgams of iron, platinum and other metals which ordinarily do not combine with mercury, may be made. If sodium amalgam be put into a solution of sal-ammoniac, the amalgam, without losing its metallic appearance, increases prodigiously in size, and reminds one now-a-days of Pharaoh's serpents; this curious experiment suggested the famous ammonium theory, which is discussed in every text book on chemistry. A very little sodium makes a solid amalgam; 1 part sodium to 50 parts mercury, gives a consistency of butter; 1 sodium to 30 mercury gives a solid, not so tough, but otherwise much resembling zinc. But these facts are not new, and we proceed to those which are the object of this article.

Dr. Henry Wurtz, now of this city, but formerly of the Patent Office, is the discoverer of the new uses of sodium amalgam. From patent examiner, he has become an inventor; we congratulate him on his auspicious beginning. Dr. Wurtz has found that when a very little sodium is added to ordinary mercury, the affinity of the mercury for metals generally

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s so increased, that for use in the arts this mixture acts almost like a new substance. Gold and silver miners have long complained that their mercury was too feeble in solvent power, was liable to "flour" and to get "sick," etc.; that the gold is often in a condition, as in Colorado, where it slips through the fingers of any device set to catch it. Dr. Wurtz's invention is said to be a complete remedy for all these ills. Whenever sodium amalgam touches gold it sticks to it and does not let it go; it sticketh like a brother; to gold and silver it is as adhesive as tar to a contraband. Sodium amalgam is sometimes called magnetic amalgam.

Dr. Wurtz has found other uses of sodium amalgam; we have space only to allude to them. He proposes to solidify mercury by means of sodium, and transport it in solid blocks, and when the mercury is to be used, the sodium is removed by a simple process. If a broom be made of iron wire, and charged with the amalgam, it is very useful for sweeping together mercury which has been spilled. Every little particle sticks to the broom, from which it may be shaken off at pleasure. An iron brush may be used like a paint brush, in amalgamating zinc plates for the battery, etc.

Mr. William Crookes, the able editor of the *Chemical News*, appears independently to have discovered the useful properties of sodium amalgam. But there is little doubt that Dr. Wurtz is the original and first inventor. He antedates Mr. Crookes eight months by his patent, and there is evidence that he has been investigating the subject for several years.

COLLAPSE OF AN ENGLISH BOILER FLUE.

The London *Engineer* of the 13th ult., publishes a handsome engraving of a boiler which collapsed a flue in the brewery of Messrs. Bass & Co., Burton-on-Trent, England.

The boiler was one of a class comparatively unknown in this country, the Cornish boiler, but very popular in England. A Cornish boiler is one tube inside of another, a single flue boiler we should call it, with the grate bars in one end of the tube.

The boiler which gave out was 32 feet long and 7 feet in diameter inside, while the tube was 4 feet in diameter and but $\frac{7}{16}$ths *of an inch thick;* in addition it was out of round by 2 inches.

The safety valves were loaded to a pressure of 50 pounds per square inch, and the sides of the flue were shut together by the pressure, so that it looked like the figure 8.

"The whole boiler was torn off its seating, and launched about 7 or 8 feet. This effect was doubtless due to the reactive force of the steam, which probably issued a contrary direction to that in which the boiler was driven. One end of the engine house was made a complete wreck—some of the bricks being sent eighty yards. The flue tube was found collapsed from one end to the other, rending at the angle iron at the back end of the shell, and at some of the other transverse seams of rivets. We have stated that it was fed by an injector, and a sort of attempt was made at the inquest to show that, as it was shut off, this accounted for a lack of water and consequent collapse. It is also true that the same witness stated that the top of the flue, for a space of four feet, bore evident marks of having been overheated. Mr. R. B. Longridge, chief engineer to the Boiler Insurance Company, Manchester, however, plainly contradicted this evidence, attributing the collapse "entirely to over pressure," as the flue could not safely bear a working pressure of more than 40 lbs. Mr. L. E. Fletcher, the chief engineer of the Manchester Association for the Prevention of Boiler Explosions, was not examined at the inquest, but, as the result of a personal investigation, he writes, in his report for last July:—"There could be no doubt that the explosion resulted entirely from the weakness of the flue, which was insufficient for any pressure above 30 lbs., but could have been made perfectly safe at 60 lbs. or even at a much higher pressure, by the introduction of flanged seams, or incircling hoops of T iron, or bridge rail section, applied at the ring seams of rivets. There are also other means for strengthening furnace flues, such as water pockets, or water tubes, etc., but since these strengthening pockets or water tubes cannot extend into the furnace, it is well to supplement them at that part with flanged seams or T iron hoops. After boilers are completed and set to work, the furnace tubes can readily be strengthened with angle iron hoops made in segments so as to be passed into the boiler through the manhole, and fixed to the tube when in place."

Mr. Bass, M. P., has made himself conspicuous by legislative measures against the noisy nuisance of barrel organs. Would it be inappropriate to ask him to direct his faculties to the prevention of the more serious noises made by boiler explosions?

AN UNPALATABLE TRUTH.

After a large number of broadside ironclad ships of war have been built in England on the old fashioned plan, necessitating the expenditure of millions of pounds, practical men there discover that they are useless, and that in the event of any contest with a nation possessing invulnerable ships—monitors for instance, they stand no chance of success.

"Coming events cast their shadows before," and we find such men as John Bourne, one of the first engineers in England, beside others, advocating the monitor system as the one good thing that has been tried and not found wanting.

"A naval architect" writes to the *Mechanics' Magazine*, "I am glad to find that you are drawing attention to the penetrable character of our ironclad navy, and to its utter futility in the case of a maritime war when opposed to monitors of the American construction, such as the *Puritan*, *Dictator*, *Monadnock*, etc.," and the letter concludes by averring that the monitors are the only safe vessels at sea and that they have repeatedly sunk ships equal to the English iron clads.

These statements are all true, and it must be an unpleasant reflection for those in authority to know that they have been walking blindly and that the expensive experiments they have made in the way of vessels are thrown away.

We have no wish that the English Government should adopt our plan of constructing war vessels, but that those who shape public opinion on these points are preparing the way for them is an unmistakable conclusion.

Novel Application of Turpentine as a Fuel.

On the 18th of February, Capt. Shpacovski, professor at the Paul Military School, exhibited at the Old Admiralty, St. Petersburg, certain applications of combustible fluids, reduced to dust or spray by means of an apparatus which he calls a pulverizer. This process enables the inventor to burn every particle of the fluid; he effects this in a lamp of a peculiar construction. The flame produced by turpentine spray in the apparatus is enormous, and reaches a hight of two feet, rushing through the burner with a noise similar to that of steam escaping from a pipe. The color of the flame is a whitish yellow; the temperature is equal to that of molten steel (1,040 deg. Reaumur, equal to 1,300 deg Centigrade.) The quantity of turpentine burnt in the lamp in one hour with the pulverizer is from two to five pounds Russian, which, at three copecks per pound, costs from six to fifteen copecks. Mr. Shpacovski began his experiments by melting a bundle of fine steel wires. This was soon brought to a red heat, and in a few seconds began to melt and then to burn, throwing out sparks. The inventor then applied the flame in a horizontal jet to a piece of copper weighing five zolotniks, which was equally melted (copper melts at about 873 deg. Reaumur, or 1,090 deg. Centigrade). He also exhibited a crucible to melt from five to ten pounds of the same metal. Among other experiments some were made to illustrate the application of the process to the charring of timber used in the construction of ships. The wood was not destroyed, being only carbonized to the depth of $\frac{1}{120}$th. of an inch. After exhibiting a lamp with four pulverizers, giving a flame of $3\frac{1}{2}$ feet in hight, and 4 inches diameter, Mr. Shpacovski described his steamboat, the boilers of which are heated by pulverized turpentine. This boat, about 24 feet long by 3 feet beam, with an engine of 2-horse power, runs six knots per hour; her boilers are heated by four pulverizers, fed by pipes from a reservoir placed in the bows. The consumption was 3 lbs. per horse power per hour; but Mr. Shpacovski is now building a boat of 6-horse power, with an improved boiler, and expects to reduce the consumption of turpentine to $1\frac{1}{2}$ lb. or 2 lbs. per horse power per hour. He has orders for twenty similar steamboats for St. Petersburg and neighborhood; most of them are intended for the passenger traffic on the canals. It is needless to state that the new fuel is more expensive, weight for weight, than coal; but it is claimed that this will be more than compensated by the saving which will be effected on the quantity consumed by means of the new process. Suppose, for instance, a frigate anchored in the roads off Cronstadt; a boat is sent ashore for provisions. The ordinary coal boilers must be fired two hours before hand, and when the boat is alongside the wharf the fires must be kept up till she returns; so that for a trip of half an hour's going and coming, fuel must be burned during four hours. If the boat be fitted with the pulverizer it need only be ignited ten minutes before starting, and altogether fuel will be required for fifty minutes, the expense for a steamboat of 12-horse power being about sixty copecks. Mr. Shpacovski also exhibited a new signal apparatus, giving a very strong light. —*London Engineer.*

Copper Photographs.

A. M. Mialerlt-Becknell, who writes from St. John the Baptist, in Louisiana, communicates to *Cosmos*, a very simple process for producing photographs on copper plate. The author takes a smooth and perfectly clean copper plate and dips it for 30 seconds into a bath composed of sulphate of copper 125 grains, common salt 75 grains, water 2 ounces, acidulated with a few drops of acid, any acid whatever. As soon as withdrawn the plate is well washed, and then dried with a soft clean cloth. The plate is then ready for exposure in a frame under a glass negative. In good sunlight five or ten minutes' exposure is sufficient, but in cloudy weather a longer time is required. To fix the picture it is only necessary to dip the plate into a solution of hypo containing a little chloride of silver A bath which has been used for paper proofs will do, but it must be filtered clear. After a few seconds' immersion the parts of the picture that were reddish whiten, and at the same time the shadows take a violet tint, passing away to black. As soon as this occurs the plate must be taken out, well washed, and dried over a spirit lamp. As the blacks are formed of a very fine powder the plate must be varnished to preserve the picture. The author supposes that a layer of protochloride of copper formed in the bath constitutes the sensitive surface, and he thinks that in the hypo and chloride of silver bath the unacted-on protochloride is dissolved, and silver is deposited on the bare copper.—*Chemical News.*

Pumping Ships by Force of Wind.

In 1862, in reviewing the nautical models at the International Exhibition, we noticed a plan for giving motion to cranks of pumps by the medium of a screw, dragging in the water, turning a long rod, and by bevil gearing working pumps in-board. We stated at the time, that the wind that drove the ship to gain this motion would also turn the sails of an improvised windmill, which would answer the purpose sought to be attained in a more simple manner.

The master of the *Providence* caught at our suggestion, rigged two wings, and fixed them to a deck pump. It succeeded admirably. Captain Kerr, of the *White Star*, it is stated in the *Shipping and Mercantile Gazette* of Monday last, kept his pumps going from shortly after leaving Melbourne to his arrival in the Channel, and by this contrivance the leak of upwards of one foot per hour was kept under. A leak of this description would have worn out his crew, whereas the sails of the windmill would actually help to propel the ship.—*Mitchell's Journal.*

[Just so, and a man can lift himself up by his pantloons if he is only able.—Eds.

A GENERAL convention of all the railroad presidents, chief engineers and general superintendents in the United States is to be held in Philadelphia on the 4th of July next, for an interchange of views in regard to railroad construction, management, and operation. The chief officers of the British Provinces have been invited to attend and participate in the deliberations.

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THE THIRD LECTURE OF PROFESSOR DOREMUS'S COURSE.

The third and last lecture of Professor Doremus's course on "Views of Life through the Medium of of Natural Science," was delivered in the evening of Saturday, April 21, before the same large audience that had listened with so much interest to the other lectures of the course. The subject of the first lecture was heat, of the second light, and of the third electricity and magnetism, with a glance at the relation of the imponderable forces to each other.

ELECTRON.

The speaker commenced by taking up a large and fine specimen of amber, which he rubbed upon the sleeve of his coat, and showed that it would then pick up light pieces of paper from the table. He stated that this mysterious property of amber was discovered by Thales, of Miletus, six hundred years before the Christian era; as the Greek name of amber is electron, the attractive force received the name of electricity. The nature of this force is as mysterious and wonderful to us as it was to the ancients who first discovered it, but we have accumulated a vast mass of facts in relation to its operation. We now know that instead of being confined to the friction of a single substance, it is developed in every change of form of every substance in nature.

HYDRO-ELECTRICITY.

When water is condensed from the gaseous state of steam, electricity is developed in enormous quantities. With galvanic electricity, we consider it extraordinary to obtain a spark ten or twelve inches in length, but with a suitable apparatus hydro-electricity has been collected of such intensity that it would leap a chasm, from one electrode to another, of nine feet!

THE VOLTAIC BATTERY.

The voltaic circuit was described in a previous lecture. The speaker exhibited several modifications of that, and finally one of two fluids—dilute sulphuric acid, and a solution of bicromate of potash—in which for the platinum plate was substitued carbon powerfully compressed and cemented in a mass by paraffine. At the back of the stage were seen several hundred of these cups, forming the most powerful battery ever collected on this continent. Two ribbons of copper, an inch and a half in width, were employed to connect the opposite poles of this battery, and whenever, in moving them about the stage they accidentally touched each other, the copper instantly flashed into a bright green flame. When the zinc of one cup is connected by a metallic conductor with the carbon of the adjacent cup, and so on through the battery, though the quantity of electricity is not increased, its intensity is augmented; it will overcome greater resistance, but will not decompose a larger quantity of any compound. By connecting the several zinc plates with each other, and the several carbon plates with each other, and then joining the two combinations, the quantity is augmented without any increase in the intensity. With the large number of cups in this battery, they may be so grouped as to give any desired quantity, or intensity, or both combined.

ELECTROLYSIS.

The two copper ribbons of the battery were connected with two wires, which had been fixed in the bottom of a jar of water, and so soon as the connection was made, bubbles of gas began to rise so rapidly as to give the liquid a white turbid appearance. The speaker explained that these bubbles were oxygen and hydrogen gases, the two elements that compose water being separated by the electric current. The decomposition of any compound by the electric current is called electrolysis. The neatest of all modes of decomposing water is by electrolysis. If one electrode is introduced into the mouth of one bell glass or inverted jar, and the other into the mouth of another jar—both being in one vessel—the hydrogen gas is all collected in one jar, and the oxygen in the other. The hydrogen always is of just twice the volume of the oxygen, though the oxygen weighs eight times more than the hydrogen—showing that water is composed of eight parts by weight of oxygen to one of hydrogen, and that the specific gravity of oxygen gas is sixteen times that of hydrogen.

AMMONIUM AMALGAM.

So far as we know, all metals are simple substances—none of them having ever been decomposed; but some doubt has been thrown on this view of the simple constitution of the metals by the fact that we have one compound substance which exhibits many of the properties of metals. This substance is ammonium, and it is composed of hydrogen and nitrogen in the proportion of one atom of nitrogen to four of hydrogen—the composition of ammonia being one atom of nitrogen to three of hydrogen. Among the properties which ammonium has in common with metals is that of forming an amalgam with mercury.

A tall beaker glass was exhibited containing a solution of chloride of ammonium, and into this was dropped a few pellets of the amalgam of mercury and sodium. Instantly the most violent action took place; the chlorine entered into combination with the sodium to form common halt, and the ammonium formed an amalgam with the mercury, increasing its volume enormously.

MAGNETISM.

Long before the commencement of authentic history, it was known that a certain natural mineral, it delicately suspended, would point one part toward the north and the other toward the south. This mineral was called by the Greeks magnet, from Magnesia, the place where they found it. We now know that it is a certain oxide of iron which occurs in various parts of the earth. If this mineral is rubbed upon a piece of steel, it imparts its peculiar property to the steel; and thus is constructed the mariner's compass—that wonderful little instrument upon which all distant navigation depends.

PARAMAGNETISM AND DIAMAGNETISM.

It was long supposed that iron was the only substance which was affected by this mysterious force, but it was found that nickel and some other metals were slightly attracted by magnets, and the researches of Faraday have demonstrated that all substances are affected in one way or another by the power of magnetism. A needle of iron, if suspended near a magnet, assumes a position parallel with the magnet, while a needle of copper arranges itself in a position diametrically across the magnet, and Faraday found all substances acting in one of these two ways. Those that become parallel with the magnet he called paramagnetic, and those which swing diametrically across the magnet he called diamagnetic. Not only are simple elements found to belong to one of these classes, but compound substances also—even organic compounds—a piece of bread or an apple—and the various gases.

A copper wheel was exhibited suspended between the poles of an electromagnet, and the lecturer stated that if the wheel was made to rotate when the current was not passing around the core of the magnet, the wheel would run without apparent resistance, but so soon as the current was formed, a strange resistance was experienced, as if the wheel was pressing between two pieces of cheese. If, overcoming this resistance, the wheel was made to rotate, it would grow rapidly warm, and eventually red hot.

THE MOST DELICATE THERMOMETER.

If two bars of metal of different kinds, for instance, a bar of bismuth and a bar of antimony, be soldered together at one end, the opposite ends being connected by an electric conductor, then if the soldered end of the bars be heated an electric current will pass through them.

By collecting a number of these pairs the electricity is increased, and such a combination is called a thermo-electric pile. By passing the current thus generated around a bar of soft iron, we, of course, produce an electro-magnet, in which both the electricity and magnetism are generated by heat. By having the magnet act upon the short arm of a long index, we have an instrument which will indicate more minute changes of temperature than any other.

The lecturer held up a brass box about a cubic inch in dimensions, and stated that that contained a series of several small bars arranged as a thermo-electric pile. When it was properly shielded from lateral rays, if the human hand was presented to its face at a distance of forty feet, the index instantly moved!

THE GEISLER TUBES.

If two wires are placed parallel and near each other, at the instant a current of electricity is passed through one wire, an induced current passes for a moment through the second wire, but in the opposite direction from the first. The induced current instantly ceases, but if the primary current is broken, a second induced current passes momentarily through the adjacent wire, but in the opposite direction from the first induced current. By winding the wire for the primary current in a coil or helix, and coiling around it a finer wire for the induced current, with suitable mechanism for automatic breaking and closing the primary circuit, we may obtain a rapid succession of induced currents. Such an arrangement is called a Ruhmkorff coil.

A very large Ruhmkorff coil was exhibited, and the old gentleman who made it, Mr. Ritche, of Boston, was introduced to the audience. The lecturer stated that the outer wire for the induced current was twenty-five miles in length, and the instrument was of such power that Mr. Ruhmkorff had declined to attempt its construction.

The lights were now turned down, and Mr. Ritchie proceeded to exhibit the passage of electricity from his large coil through the tubes of attenuated gases, that have been named after Mr. Geisler. The delicate flash and play of these yellow, violet and rosy lights no pen can describe; many who witnessed them considered the exhibition worth the high cost of the whole course of lectures.

A SCIENTIFIC MIRACLE.

Among the various matters introduced for illustration in the course of the lecture was a description of the constitution of gun-cotton. It was stated, that by treating cotton, linen, or any other vegetable fiber composed principally of cellulose, with nitric acid, the acid lost one equivalent of oxygen, becoming NO_4 and this was substituted for a portion of the hydrogen of the cellulose. This change introduced a large quantity of oxygen into the compound, thus making it more inflammable. This change is as readily wrought in linen as in cotton, so we may have gun-linen, as well as gun-cotton.

The lecturer said that he treated a linen handkerchief with nitric acid, making it into gun-linen, and threw it into the wash with his other clothes. His servant girl washed and dried it, of course without perceiving any difference in its character. She then laid it upon the table to iron it, but at the first touch of the hot iron, the handkerchief vanished with a light flash, leaving no trace behind.

THE CLOSE.

With an eloquent tribute to the enlightened enterprise of the Mercantile Library Association, and with a cordial acknowledgment of the zeal and efficiency of his assistants, Professor Doremus took a graceful farewell of his large audience.

American Riflemen's League.

The various rifle clubs and associations of the United States have formed a general organization with the purpose of stimulating a friendly intercourse among members of rifle practicing societies, in cultivating the art of rifle shooting, and in diffusing a knowledge of the use of fire-arms generally among the nation, similar to the organization of Germany and Switzerland, at the annual gatherings of which tens of thousands of the best marksmen of the world congregate for the purpose designated. The second annual convocation of the League of the United States will be held at Chicago this year, commencing on the 13th of June, and continuing for five days. Preparations upon the most extensive scale, and at an enormous outlay, are in contemplation to accommodate the riflemen from all parts of the Union.

Safety Apparatus for Steam Boilers.

The invention of Mr. J. M. Courtauld, of Brocking, consists in the employment of a copper or other suitable metal tube, carried through the upper part of the boiler, and descending below the proper working level therein, and in connecting to the upper part of the tube carried to a greater or lesser hight from the top of the boiler a rod, which, by the expansion of the tube, acts upon a safety valve, when the water falls below the proper level, and allows steam to escape from the boiler.—*Mining Journal.*

[This gage is an American invention and has been in use in this country for some time. It is owned by Messrs. Carpenter & Van Riper. It works very satisfactorily. —Eds.

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Notes and Queries

C. J., of R. I.—We are much obliged for your offer to write us an article on "Muscular Sense," but we fear most of our readers would find it heavy.

D. T. S., of N. Y.—The English and American wire gages are not the same. Send to J. R. Browne & Sharp Providence, R. I., and get their circular on this subject.

Subscriber, of N. Y.—Brazing on cast iron is easily done by the aid of borax and brass filings. No cement will make rubber adhere firmly to cast iron. Marine glue will cause paper to stick to hard wood exposed to steam. For recipes you must look in back numbers. We cannot fill our paper with old recipes we have published numberless times.

J. B. U., of La.—The magnesium light is remarkable for its actinic power, and on this account it has so much celebrity. As a substitute for oil and gas for ordinary illuminating purposes, magnesium is impracticable on account of its expense; a pound of it costs more than a hundred dollars, while a pound of oil or gas may be bought for a few cents.

M., of S. C.—Proposes that balloonists carry up with them reservoirs of condensed gas, to be used as occasion requires, to replace the gas which may escape from the balloon, and thus to assist in prolonging the flight. The idea is not new.

PATENT OFFICE.

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In connection with the publication of the SCIENTIFIC AMERICAN have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *twenty years*. Statistics show that nearly ONE-HALF of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after so many years' experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all **business** before the Patent Office.

Judge Mason, formerly Commissioner of Patents, says, in a letter addressed to us:—"In all your intercourse with the office, I always observed a marked degree of promptness, *skill*, and fidelity to the interests of your clients."

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EXAMINATIONS.—If an inventor wishes our opinion in regard to a probable novelty of his invention, he has only to send us a pencil or pen-and-ink sketch of it, together with a description of its operation. For an opinion, without examination at the Patent Office, we make no charge, but if a

PRELIMINARY EXAMINATION AT THE PATENT OFFICE

is desired, we charge the small fee of $5. This examination involves a personal search at the Patent Office of all models belonging to the class, and will generally determine the question of novelty in advance of an application for a patent. Up to this time we have conducted over ELEVEN THOUSAND Preliminary Examinations, thus showing a more intimate knowledge of inventions at the Patent Office than can be possessed by any other person or firm.

If an inventor decides to apply for a patent, he should proceed at once to send us by express, charges prepaid, a model not over one foot in size, and substantially made. He should also attach his name and residence to the model.

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On issuing each original Patent	$20
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On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Canadians have to pay $500.

FOREIGN PATENTS.—Messrs. MUNN & CO. have had more experience than any other solicitors in this country in procuring foreign patents, and have old established agents in London, Paris, Brussels, Berlin, Vienna, and other large cities. Foreign business should never be intrusted to other than experienced agents.

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Patent Claims

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FOR THE WEEK ENDING MAY 1, 1866.

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☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

54,272.—Butter Worker.—J. P. Adams, Whitney's Point, N. Y.:

I claim the arrangement of the frame, D, pivoted at b, the rock shaft, S, the arm, M, and the swivel joint, N, used with the bowl, F, and its connections, substantially as and for the purpose herein specified.

54,273.—Joint of Spectacle Bow.—Henry C. Ammidown, Southbridge, Mass.:

I claim a spectacle joint having a construction, substantially as described.

54,274.—Meat Chopper.—Frederick Ashley, New York City:

I claim in combination with a suitable box or receptacle for the meat or other article to be chopped or cut, the swinging chopper or knife beam, E, having arms, L, L2, when so arranged and connected together that by the up and down movement of the said beam the said meat box will be rotated, substantially as described and for the purpose specified.

I also claim the use of a spiral or other suitable spring connected with the chopper beam, as and for the purpose specified.

[This invention consists in arranging the vessel in which the meat to be chopped is placed, in such a manner that it can freely revolve, and in so connecting the beam having the chopping knife hung at one end so as to swing up and down to the said meat receptacle, that by the up and down movement of the knife beam the receptacle will be revolved, thereby causing all portions of the meat contained in it to be subjected to the action of the chopper, as it is from time to time depressed or brought down upon the same.]

54,275.—Hanger for Shafting.—John E. Atwood, Mansfield, Mass.:

I claim, First, The disk, w, applied to the head, i, of the screw, C, and operating in connection with the ribs or feathers, E E, to hold the said screw, substantially as herein set forth.

Second, The disk, v, constructed and applied to the nut, u, and operating in connection with the ribs or feathers, E E, to hold the said nut, substantially as herein set forth.

Third, The shouldered annular disk, r r', constructed and applied to, and operating in connection with the shouldered nut, m n, and ribs or feathers, h h, substantially as herein set forth, for the purpose specified.

Fourth, The arms, G, working in vertical grooves in the sides of the journal box so as to admit of the vertical adjustment of the said journal box, substantially as herein set forth for the purpose specified.

Fifth, The rotating feeding disk, I, weighted levers, J, J, and wipers, j j, arranged with reference to each other and with the oil vessel, H, and shaft, B, substantially as herein set forth for the purpose specified.

54,276.—Water Elevator.—Stephen L. Avery, Norwick, N. Y.:

First, I claim the combination as herein described, of a weight, F, with the rim of a loose annular friction collar, E, when said collar is combined with a crank, D, and with the ratchet wheel of a windlass, substantially in the manner and for the purpose herein set forth.

Second, I claim the combination of a central, circular, slotted washer, k, with an annular friction brake and crank, D', and with a shaft, A, substantially in the manner and for the purpose herein described.

Third, I claim also the metallic windlass drum, when said drum is composed of two sections, G G, formed substantially as herein described, and united together and secured upon a shaft in the manner herein set forth.

Fourth, I claim in combination with the valve, M, of a well bucket, a jointed connecting and lifting rod, o, made substantially in the manner and for the purpose herein set forth.

54,277.—Clock Escapement.—Benjamin Bacon, jr., Morrison, Ill.:

I claim the pallet above shown, consisting of two parts, each mounted on a different axis, and connected to each other by arms, jointed to each other, so that the motions of one of the parts is controlled by those of the other, substantially as described.

54,278.—Gas Pipe Tongs.—David Bannister, Philadelphia, Pa.:

I claim the lever, A, with its hardened edge, C, and notch, D, in combination with the hook, B, made in the manner and for the purpose specified

54,279.—Sorghum Funnel.—Abraham Bare, Mexico, Ohio:

First, I claim a cylindro-conical funnel, A B, which is constructed with a strainer, a, applied at the junction of the cylinder with the cone, substantially in the manner described.

Second, The combination of the cylindro-conical funnel, A B, with a removable strainer, C, substantially as described.

Third, The combination of a fixed or permanent strainer, a, with a removable strainer, c, and a funnel, substantially as described.

54,280.—Cultivator.—Henry Barnes, Burlington, Wis.:

I claim the combination and arrangement of the thills, A, standards, G H, cross pieces, C D, rods, L M, and connecting bars, s O, constructed and employed in the manner and for the purposes specified.

54,281.—Bed Bottom.—S. W. Beach, Niles, Mich.:

First, I claim the levers, B B, in combination with the bed bottom, a b, and spring, C, substantially as specified.

Second, So mounting a bed bottom that the same will receive its necessary springing motion from a single spring, C, arranged so as to operate substantially as specified.

[This invention consists in mounting the bed bottom on levers whose lower ends are operated upon by a spring arranged transversely across the bedstead, all the parts being so constructed and arranged that the bed bottom will have the desired rising and falling motion, to make an easy sleeping bed.]

54,282.—Measuring Faucet.—Edmund Bigelow, Springfield, Mass.:

First, I claim the measuring chamber, D, constructed of glass or other suitable non-corrosive material as described, and constructed, fitted to the metal portion, A, of the measuring faucet, as herein specified.

Second, And in combination therewith the valve, F, and piston E, arranged and operated, substantially as and for the purpose specified.

Third. The head or cut-off, G, when used in connection with the valve, F, and piston, E, and arranged relatively with the opening, e, and vent, f, in the part, A, of the faucet to operate in the manner, substantially as and for the purpose specified.

54,283.—Staple.—Byron Boardman, Norwich, Conn.:

I claim a staple provided with longitudinal grooves or corrugations in combination with transverse ribs elevated to about the same hight above the body of the staple as are the corrugations, the whole being so shaped as to be capable of being formed by swaging machinery, for the purpose and substantially in the form above described.

54,284.—Brush.—Joshua Boggs, Harrisburg, Pa.:

I claim the brush head or body, constructed of a piece of sheet metal, cut and folded in the required form, substantially as shown and described.

54,285.—Sheep Rack.—George W. Boynton, Auburn, N. Y.:

I claim the combination of the bar, m, the boards, O and P, the slides, b, the levers, e, the rods, t, and the lids, c, the whole constructed and operating as and for the purpose herein specified.

54,286.—Sash Fastener.—Benjamin Bray, Methuen, Mass.:

I claim the combination of the triangular toothed rack the triangular toothed spring catch and the locking device of the said catch, constructed, arranged and applied to a window sash and frame, substantially in the manner and for the purpose as herein before specified.

54,287.—Bag Fastener.—W. P. Brooks, Fairmount, Minn.:

I claim an improved bag fastener, constructed and arranged substantially as herein described and for the purpose set forth.

[The object of this invention is to furnish a fastener by the use of which grain or other bags may be securely tied or fastened, and as quickly unfastened when desired. And it consists of a strong piece or disk of leather riveted to the side of the bag near its mouth. Through this leather disk are formed holes, through which is passed a string forming loops on the sides of said disk. One of the these loops is passed over the mouth of the bag, and the others are so arranged as to hold the bag securely fastened and yet allow it to be readily unfastened when desired.]

54,288.—Water Wheel.—Harvey Brown, Chalfant, Ohio:

First, I claim a water wheel provided with semi-annular buckets, a, arranged as shown, in combination with a series of chutes, E, in the case, D, which encompasses the wheel, substantially as described.

Second, Operating, opening and closing the gates, F, by means of rods, G, attached at their outer ends by gimbal or other equivalent joints to crank rods secured to the outer ends of the buckets, and attached at their inner ends to a ring, H, fitted loosely on the wheel shaft, B, substantially as shown and described.

[This invention relates to certain new and useful improvements in horizontal water wheels, and it consists, first, in an improved arrangement of gates, and the mode of operating the same, and in an improved form of buckets, as hereinafter fully shown and described, whereby it is believed, that a large per centage of the power of the water is obtained.]

54,289.—Pump.—Ashur Burr, Middlesex, Conn.:

First, I claim the self-packing joint produced by the construction and arrangement of three notches, D, with their inclines, C, and the inclined flange, c, upon the one part, and corresponding projections, E, upon the other part, substantially as specified.

Second, The combination of the valve seat, G, the base, A, and cylinders, B, when constructed and joined together, substantially in the manner and for the purposes herein specified.

Third, Combination of the yoke, I, with the valve, H, and seat, substantially in the manner and for the purpose set forth.

Fourth, The lips, T T, and tongue, u, operating substantially the manner and for the purpose described.

54,290.—Wrench.—Robert B. Butler, Allentown, Pa.:

I claim the two bars, C F, having jaws upon each end and their corners or edges notched or toothed in combination with the hollow wrench handle having a spiral screw thread and parallel longitudinal grooves, a, upon its inside, when arranged together and so as to operate, substantially in the manner described and for the purpose specified.

[This invention consists in so constructing the wrench and arranging its two jaws with regard to each other, that it can be easily adjusted and applied to nuts of varying sizes.]

54,291.—Pump.—Adam S. Cameron, New York City:

I claim the combination of a steam or power pump and an independently operating hand pump with one set of valves, which is common to both pumps and capable of operating with either, as may be required, substantially as herein specified.

In combination with a power pump and a separate hand pump having one set of valves common to both I claim a cross head which serves both the purpose of holding the power pump piston stationary and of a support for the fulcrum of the hand pump lever when the latter pump is at work, substantially as herein described.

54,292.—Bed Bottom.—Samuel A. Canfield, Carlstadt, N. J.:

I claim the combination of the crank-shaped rods, g g, and guard ropes, h h, with the elastic bands, D D, and recessed brackets, c c, substantially as and for the purpose herein specified.

54,293.—Sugar Cane Mill.—Nathan B. Carr, Madison, Wis.:

I claim providing the levers, E, which have suitable boxes for the journals of the roller, B, with an oscillating fulcrum, substantially as and for the purposes herein specified.

I claim the arrangement of the roller, B, the levers, E, the oscillating fulcrum, F, and frame, A, when constructed and operating substantially in the manner and for the purposes described.

54,294.—Harvester Rake.—C. L. Carter, Union City, Ind.:

The arrangement of the pendent bar, H, bar, I, bar, E, crank, c, shaft, J, crank, d, rod, e, and wheel, B', operating in the manner and for the purpose herein specified.

I further claim the arrangement of the bar, I and N, bar, E, arm, M, cord, g, pendent bar, H, bar, L, and rake, K, constructed and operating in the manner and for the purpose herein specified.

[The object of this invention is to obtain a simple automatic raking attachment for harvesters, and it consists in hanging or suspending a rake over the platform of a harvester, and operating the same, whereby the draught of the harvester will not be materially increased and the work performed in a very efficient manner.]

54,295.—Packing for Pump Pistons.—John Carter, Philadelphia, Pa.:

I claim the expanding packing, H, and wedge, E, upon the conical body, C, all combined and arranged substantially as described.

54,296.—Manufacture of Confectionery.—Lewson E. Chase, Charlestown, Mass., assignor to Chase & Company, Boston, Mass.:

I claim the use or employment of glycerin in the manufacture of confectionery, substantially as and for the purpose set forth.

54,297.—Lock.—Charles Claude, New York City:

The tube, D, and disk or plate, g, provided with a guard, h, nose, i, and stop pin, l, in combination with the hinged bit of the key, K, latch or bolt, B, and one or more tumblers, E, all constructed and operating substantially as and for the purpose set forth.

54,298.—Harvester Rake.—Henry Clymo, Galen, Ill.:

I claim the loaded or weighted rake arm, J, placed on tube or rod G, so as to work or turn thereon, in a vertical plane and also to slide thereon horizontally in connection with an endless band, guide strip, e e, provided respectively with a notched flap and inclined plane, all arranged to operate, in the manner substantially as and for the purpose set forth.

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The adjustable gears, r u, in combination with the fixed gear, w, for operating the endless band or giving a reciprocating motion thereto, as set forth.

[This invention relates to a new and improved automatic raking device for harvesters, whereby the cut grain may be raked from the platform in the most efficient manner, and without in the least interfering with the cutting mechanism or any of the working parts of the harvester.]

54,299.—Truss.—James Coop, Pittsburg, Pa.:

I claim the arrangement of the flanged headed standards, e e, slide, C, and set screws, d, in combination with the hoop, A, constructed in the manner and for the purpose herein specified.

The helix springs, f f, with their crowns fixed to points of the standards and their base endshooked or secured to the pads in such manner as to allow of rotative elasticity without rotative displacement of the pads and when acting as elastic universal joints for supporting the pads, substantially in the manner and for the purset forth.

[This improvement consists first, in the manner of attaching the pad or pads to the hoop of a truss, so that they may readily set at any degree or plane of rotation; and second, in an improved method of suspending the pads to their standards, whereby they are held at any particular plane of rotation in an elastic manner, so as to accommodate themselves to any sudden or undue strain, be it a rotative or side strain.]

54,300.—Pump for Deep Wells.—Robert Cornelius, Philadelphia, Pa.:

First, I claim a slide valve adapted for the passage of the gas, in combination with valve gear operated upon by or through the piston rod for opening and closing the passages of said valve, substantially as described.

Second, A slide valve opened and closed by projections on the barrel or chamber of the pump, substantially as described.

Third, The combination of the slide valve, and the friction springs, O O', for operating the same, substantially as described.

54,301.—Process for Manufacturing Dolls.—Frank E. Darrow, Bristol, Conn.:

I claim the process of saturating raw hide for forming it into a desired form or shape, substantially in the manner as and for the purpose described.

54,302.—Grape Vine Protector.—Jacob S. Davis, La Porte, Ind.:

First, I claim the arrangement of wings, A A, hinged as described to the upright, B, when provided with suitable trellisses, H H, operating substantially as and for the purposes specified and shown.

Second, I claim the combinations of the wings, A A, upright, B, and sill, D, arranged and operating as and for the purposes set forth.

Third, I claim providing the wings, A A, the movable trellisses, H H, for the purposes specified.

54,303.—Method of Extracting Oil from Leather, Etc.—John A. Dean, Easton, Mass.:

I claim as my own invention and discovery, the process of making the composition and the new combination of the materials above enumerated.

54,304.—Medical Compound.—Honore De Lapaturette:

I claim a medical compound made of the ingredients hereinbefore specified.

54,305.—Stop Cock.—William H. De Valin, Sacramento, Cal.:

First, in steam, water or gas cocks, constructed and arranged, substantially as herein described, I claim the recess in the plug in combination with a chamber, within the case but outside of the plug so as allow steam, water or gas to pass through and press against the plug in such manner as to prevent leakage as set forth.

Second, In combination with the recessed plug and outside chamber, or the equivalent thereof, I claim the employment of a spring to maintain the plug in position when not under pressure.

Third, The combination of a recessed plug and outside chamber with an agitator fast to the plug and projecting into said chamber, as and for the puposes set forth.

54,306.—Water and Wine Cooler.—Joseph Dietschy, Alton, Ill:

I claim a combined water and liquor cooler, constructed substantially as described with the parts, A B C and H.

54,307.—Tile Kiln.—John B. Dixon, Geneva, N. Y.:

I claim the combination of the flues, E, opening near the top of and within the kiln, A, with the open floor, C, and return flues, F, connected with the chimney, H, the whole being arranged and employed substantially as and for the purpose set forth.

54,308.—Manufacture of Paper Pulp.—John W. Dixon, Philadelphia, Pa..

First, I claim the combination of the wood and straw pulp digester, the water motor and the force pump whereby the escaping water under pressure, forces fresh water in at the top.

Second, The combination of the digester, A, the water motor, the pump and the heater at K, whereby the escaping water both heats and forces in the fresh water.

Third, The combination of the digester, A, the water motor and pump, the heater, K, and the heater, E, whereby the escaping water forces in fresh water which absorbs the heat from the escaping water, and is further heated before it enters the top of the digester.

54,309.—Process of Separating the Fibers of Palm, Palmetto, Etc., for the Manufacture of Paper Pulp.—John W. Dixon, Philadelphia, Pa.:

First, I claim the treatment of the palm, dwarf palm or palmetto, by highly heated water, under pressure in a close digester, substantially as above described for preparing it for spinning or paper making.

Second, The treatment of palm, dwarf palm or palmetto, by submitting it to a highly treated water, under pressure, in a closed digester, and then to the action of chlorine or chloride of lime to bleach it.

54,310.—Machine for Rolling, Shaping and Forging File Blanks, Flyers and other Metallic Articles of Small Dimensions.—James Dodge, Waterford, N. Y.:

First, I claim the novel combination in one machine of one or more pairs of jaws or levers containing dies and matrices with rollers for rolling and forging file blanks of any desired form, flyers and other metallic articles, constructed and arranged for operation substantially as described.

Second, I claim governing the rotation of the rollers and movement of the jaws, so as to stop and start such rotation and movement at any desired time or position by means of the apparatus described, or by other mechanical equivalents.

Third, I claim the combination and use of the wedges and springs constructed and arranged as described for regulating the distance of the rollers.

Fourth, I claim the general construction and arrangement and combination of the apparatus for rolling, shaping and forging file blanks, flyers and other metallic articles of small dimensions, as hereinbefore described.

54,311.—Machinery for Hammering Heads of Axes.—Levi Dodge, Waterford, N. Y.:

First, I claim the finishing of axes by the use of dies closing upon the cheeks and heads in combination with a pin, the whole being constructed as described and operating simultaneously to give the axe its ultimate form and smooth finish, substantially as set forth.

Second, I claim the combination with the dies constructed and arranged as described, of a yielding support or spring in the applied manner, substantially as herein shown and set forth.

54,312.—Carpet Wadding.—Thomas H. Dunham, Boston, Mass.:

I claim a wadding composed of a bat or layer of fibrous materials and having either upon one or both of its sides a layer or sheet of paper in which the exterior of the fibrous bat is embedded while the paper is in the condition of partially hardened pulp, which adheres to the fiber and holds it in place without the use of starch, paste or adhesive gums.

54,313.—Buckle.—Augustus R. Egbert, Philadelphia, Pa.:

I claim the construction of the buckle with the extended angular ends and raised center as herein described, and for the purposes set forth.

54,314.—Seat and Back for Chairs.—William S. Farmer, New York City:

I claim the employment of sheets of raw hide in the bottoms and backs of chairs and other articles of furniture, for sitting and recumbent purposes when perforated and embossed substantially as herein set forth

54,315.—Horse Hoe.—S. Phelon Fish, Litchfield, N. Y.:

I claim in combination with a central plow carried by, and adjustable on the beam, the side plows carried by and made adjustable on a divided frame which is also carried on by and made adjustable on the beam, substantially as and for the purpose herein described.

54,316.—Wood Bending Machine.—John Fishbough, Tiffin, Ohio:

First, I claim shrinking and shortening all the fibers of a bar of wood by means of the devices which are used for clamping the pattern and wood upon the sill, A, and the devices used for bending such about its pattern, substantially as described.

Second, The method substantially as described of bending wood into curved forms to wit, by first bowing or arching it, and thence bending it about the pattern in a converse direction to that in which it was first bent, or bowed, substantially as set forth.

Third, The construction and arrangement of the shouldered blocks, C C, hooked screws, g g, nuts, g' g' connecting strip, F, having enlargements formed on its ends and the recessed sill, A, all used together substantially as described.

Fourth, So constructing the pattern and the follower and combining the same, that the expansion of the pattern is effected by the descent of the follower, G, and its contraction insured by the ascent of the follower, substantially as described.

54,317.—Cultivator.—Wm. D. Fisher, Freeport, Ill.:

I claim the arrangement and combination of the drops, C, equalizer, E, adjustable frame, A, regulating lever, G, and fenders, J, when arranged as herein described and for the purposes set forth.

54,318.—Boiler Tube.—Benaiah Fitts, Newark, N. J.:

I claim the cap, O, over the end of the tube, H, leaving openings, P P, or other means substantially the same for the purpose of allow free egress of the water from within the tube and at the same time prevent the steam formed under and around the end of the tube from passing into it, as set forth and described.

54,319.—Soap Stone Stove.—James H. Flagg, Perkinsville, Vt.:

First, I claim the stovepipe or flue bored out of a solid piece of soap stone, as and for the purpose herein described.

Second, I also claim in joining the pannels and plates of stoves made of soap stone or other mineral substance, the use of angle irons, B, constructed and applied substantially as described.

Third, I also claim securing linings in stoves by means of the irons which secure the outside plates and pannels, the posts, a a, of such irons being either flared, as shown in Fig. 4, or left straight as in Fig. 5, substantially as described.

54,320.—Newspaper File.—J. W. Foard, San Francisco, Cal.:

I claim the short recess at the bottom of the file, in combination with the movable nut whereby the hinge is operated, the latter enabling one to adjust the file at that end to any desired thickness of paper.

54,321.—Burial Casket.—Julian A. Fogg, Salem, Mass.:

I claim removing from the side of a coffin or burial casket whose lid opens backward, so much of its front side as is required to sufficiently expose the person of the corpse, the said removed portion being attached to the lid in such manner that when the lid is closed, it will fit into its proper place and the casket be as effectually closed as were it of the ordinary construction.

54,322.—Grain Spout.—A. D. Foote, Berlin, Wis.:

First, In the operation of loading vessels with grain, I claim providing for discharging the grain from an inclined spout at or nearly at right angles to the line of such spout, substantially as described.

Second, The combination of one or more curved sectional grain spouts, B, with the discharge spout of an elevator, substantially as described.

Third, Providing for depositing grain at either one or both ends of a car or vessel at pleasure from a grain spout, substantially as described.

54,323.—Combined Corset and Bustle.—Lavinia H. Foy, Worcester, Mass.:

First, I claim the combination with a corset, of a series of eyelet holes, c, or their equivalent and a detachable bustle, B, substantially as and for the purposes set forth.

Second, The combination with the back and sides of a corset of one or more rows of eyelet holes, c, transversely to the line of junction of the corset in the rear, substantially as and for the purposes set forth.

Third, The combination with the rim or bustle, B, of the coiled spring e, substantially as set forth.

Fourth, Making the rim or bustle, B, from a bias cut piece of cloth, in combination with inserting an elastic, C, or its equivalent, for the purposes stated.

54,324.—Button.—Charles A. French, Boston, Mass.:

I claim the combination of the stud, B, shouldered shank, a b d, and washers or eyelets, e f, substantially as and for the purpose described.

54,325.—Beehive.—Austin Fuller, Plymouth, Ind.:

First I claim the arrangement of a beehive having a double case, A B, with dead air spaces between them, and having on the front only double doors, A' B', both of which are hinged to the external case, and having also the sloping sides, I, terminating with a funnel formed mouth closed when desired by the perforated slide, K, and having also doors, F, located as described, substantially as and for the purposes set forth.

Second, In combination with the sloping sides, I, I claim the plates, L and L', substantially as and for the purpose set forth.

54,326.—Preparation of Court Plaster.—Lyman C. Gale, Chicago, Ill.:

I claim the assortment of the various forms of plaster above described, and put up in boxes or packages, as set forth.

54,327,—Planking Clamp.—Wesley Glen, Philadelphia, Pa..

I claim the combination of the knee or brace, D, having set screw, E, and pawl screw, G, and hooks, A, the screw shaft, H, and flanged screw sleeve, J, arranged in the back or upper end of the hooks upon said shaft so as to operate upon the hooks, substantially as and for the purpose described.

[The object sought to be secured by this clamp, is to economize time in planking, and in the building of staging.]

54,328.—Pneumatic Pump.—Henry Gottfried, New York City:

First, I claim the employment of a yielding head, M, or heads, M' M', arranged in the cylinder of air pumps in a manner to co-operate with the main piston for the purpose herein shown and described.

Second, The employment and arrangement of the air chamber, s, and passage, q, to the reservoir or discharge pipe in combination with the yielding head, M, the whole operating and for the purpose herein shown and described.

Third, The combination and arrangement of the drop-valve, r, in the passage, q, and with the yielding head, M, operating in the manner and for the purpose herein described.

Fourth. The employment of the delivery valve, n, arranged in the yielding head, M, for the purpose of symplifying the construction in producing an air tight joint between the yielding head and piston when brought together.

54,329.—Roll for Manufacturing Three-headed Railroad Rails.—James Gower, Ironton, Ohio:

I claim the arrangement of rolls, Figs. 1 and 2, and mandrels, A A', or their equivalents for the manufacture of three-headed railroad rails, substantially as set forth.

54,330.—Head Block to Saw Mills.—Henry H. Gridley, Auburn, N. Y.:

First I claim giving the described "set" to the head blocks of a saw mill automatically, by the means substantially as above described

Second, Also the combination of the lever, E, with the camt, a, with the stationary rod or trip arm which it passes, as and for the purpose described.

Third, Also the mechanism whereby the "set" may be given to the head blocks of a saw mill automatically in combination with the hand lever to operate said mechanism by hand, as may be desired, substantially as above described.

54,331.—Balanced Slide Valve.—John R. Grout, Detroit, Mich.:

I claim First, The recess or chamber, h, formed in the upper face of the valve, substantially as and for the purpose set forth.

Second, The counter-balancing chamber, in the upper face of the valve, e, in combination with the openings, i i, from exhaust chamber, h for the purpose substantially as herein described.

Third, The recesses in the chest cover and the chamber, h, in the upper face of the valve in combination with openings, i i, and exhaust chamber, g, operating substantially as herein set forth.

Fourth, The wire bar, i, constructed and arranged to operate, substantially as herein described,

54,332.—Broom Head.—Samuel B. Gurnsey, Chicago, Ill.:

I claim the combination of the bar, E provided with hooks, e e, the rod, F, and broom head, A, when arranged so as to tighten the broom corn independent of the broom handle, substantially in the manner specified and shown.

54,333.—Car Brake.—Sive Guilbert, New York City:

I claim the chains, d, and bolts, e, in combination with the screws, c, and with the platform of a car constructed and operating substantially as and for the purpose set forth.

54,334.—Well Curb.—Christopher Gullmann, Poughkeepsie, N. Y.:

I claim the arrangement of a ball or disk governor, E, in cambination with the windlass shaft, B, and well curb, A, constructed and operating substantially as and for the purpose described.

[This invention consists in the arrangement of a ball or disk governor in combination with the windlass shaft of a well curb in such a manner that by the action of the air against the balls or disks the speed of the descending bucket is checked, said balls or disks being secured to swinging arms so that the same are allowed to fly out, if the speed of the governor increases, and that the resistance of the air is made to act on longer levers and consequently with increased power if the speed of the governor is larger than if said speed is small.]

54,335.—Elastic Cushion and Guard for the Feet of Horses.—William H. Hall, New Gloucester, Maine:

I claim the use of the elastic inner shoe and guard when cut or cast into the form herein described, for the purpose set for.

54,336.—Engine Governor.—William J. Hallefass, Brooklyn, N. Y.:

I claim the governor, A A, when in combination with the inclined planes, f, antifriction rollers, i j, and a valve stem, k, arranged and operating substantially in the manner and for the purpose set forth.

54,337.—Portable Cooking Apparatus by Lamps, Etc.—C. A. Harper, Little Rock, Arkansas:

I claim the boiler, A, oven C, and burner, E, when constructed, arranged and combined substantially as herein described and set forth.

54,338.—Broom Head.—John Harris, Marquette, Wis.:

I claim the combination of the crescent shaped socket A, projecting handle socket, a, arms, b b, serrated bars, C C, clamp jaws, B B', screw, c, and nut, d, all constructed, arranged and employed as and for the purpose specified.

[This invention consists in a combination of parts to produce a broom and brush head, in which the broom corn or bristles can be very easily inserted and clamped and held securely.]

54,339.—Process for Preparing Wood for Boots and Shoes.—Robert T. Havens, Wilmington, Ohio. Antedated April 16, 1866:

I claim the process as described for the purpose of producing flexible wood for boots and shoes, as specified.

54,340.—Evaporator.—B. K. Hawley, Normal, Ill.:

I claim first, In apparatus for evaporating the juice of sorghum or other substances forming an evaporating pan above and down each side of the furnace, substantially as described.

Second, I also claim forming two pans side by side behind the furnace, and passing the furnace flues directly through them to the chimney, when the said flues are controlled by separate dampers or set of dampers for the flues of each of the back pans, substantially as shown and described.

54,341.—Tinman's Forming Tools.—William H. Henderson, Franklin, Ind. Antedated April 16, 1866:

I claim in combination with frame, A, the gaging side, g, vibrating clamp, B, arms, c, springs d, edging clamp, C, and disk, e, as above described and for the purpose set forth.

54,342.—Tinner's Edging Tools.—William H. Henderson, Franklin, Ind. Antedated April 16, 1866:

I claim, in combination with frame, A, the gaging side, g, vibrating clamp, B, arms, c, springs, d, edging clamp, C, and disk, e, as above described and for the purpose set forth.

54,343.—Churn.—Silas Hewit, Seneca Falls, N. Y.:

I claim First, The beaters, x y, in combination with the triangular brake, G, as and for the purpose specified.

Second, I claim the shifting gear, L in combination with the gears, P Q, and beaters, x y, as and for the purpose specified.

Third, I claim the bridge, H', for supporting the zinc bottom as described.

Fourth, I claim the blocks, K, in each corner for the purpose set forth.

54,344.—Skate.—Benjamin H. Hibler, Newport, Ky.:

I claim a skate composed of the following element, to wit: An elastic plate or sole, A, bent so as to present a vertical shoulder or abutment, A', a divided runner, B C, a heel clip, H d e, and an adjusting screw, G, the whole being combined and adapted to operate as set forth.

54,345.—Compositions for Disinfecting and Preserving.—John Hickson and Lyman L. Wilkinson, Auburn, N. Y.:

We claim the compound No. 1 and 2, when made, substantially as above set forth.

54,346.—Steam, Water, or other Pipe.—Edward H. Hill, Worcester, Mass.:

I claim as an improved article of manufacture, a pipe for water, steam and other purposes, made as described and shown in the accompanying drawings.

54,347.—Filtering Faucets.—George Hillegass, Philadelphia, Pa.:

I claim constructing the reversible spigot of a faucet with a chamber and dovetailed slide, C, so arranged as to secure a fitter, felt, or other material, E, or screw, E', across the chamber through which the fluid must flow in passing through the faucet, substantially in the manner and for the purpose set forth.

54,348.—Bolt Fastening.—J. M. Hopkins, New York City:

I claim the combination of the crank shaft, D, bolt, H, and thumb pieces or buttons, L M, when connected and arranged together so as to operate substantially in the manner described, and for the purpose specified.

[This invention relates to a new and improved bolt, especially adapted as a fastening for doors of book cases, closets, window sashes, and many other similar purposes, and it consists in a novel arrangement of parts in connection with the bolt, whereby it can be thrown out or drawn in with the utmost ease and facility, and by simply pressing with the fingers or thumb of the hand upon certain portions of the bolt connections.]

54,349.—Grate Bar.—David Housten, New York City:

I claim, and desire to secure, by letters patent the bearing bar, b, connected to the grate bar, a, at or near its center, and resting at its ends upon the same bearers as the ends of the bar, a, but discon

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nected from said bar, a, at its ends so as to allow the grate bar to expand independently of the bearing bar, as set forth.

54,350.—Flush Bolt.—J. M. Hopkins, New York City:

I claim the combination of the bolt, B, lever, H, thumb lever, M, and a coiled or other suitable spring with the connecting rod, E, when arranged together so as to operate substantially in the manner described, and for the purpose specified.

[This invention consists in a novel arrangement and connection of devices with the bolt, whereby many important advantages are secured.]

54,351.—Straw Cutter.—L. B. Hoit, Cedar Falls, Iowa:

I claim the combination and arrangement of the rollers, C D, wheels, F J, disk, G, and knife, I, as and for the purpose specified, and in combination therewith, I claim the guide, M, as set forth.

54,352.—Bench Vise.—Harrison P. Hood, Lowell, Mass.:

I claim in the said improved bench vise, as made with the jaw carriers, A B, applied to the bar, c, as set forth, the arrangement of the clamp lever on the jaw carrier, B, substantially as specified, the spindle being jointed to the said lever and extended upward through the bar, C, and jaw carrier as explained.

54,353.—Burglar Alarm.—Edmund Hoole, New York City:

I claim the dovetail tapering slots, D, situated opposite to each other in the frame or base plate, A, of a burglar alarm, in combination with the tapering dovetail plate, E, substantially as and for the purpose specified.

54,354.—Sash Supporter and Fastener.—James Hopkins, Madison, Wis:

First, I claim the brace, A, having its upper end the heavier, and provided with the inclined corrugated cam face, when constructed in the form shown, and arranged to operate as set forth.

Second, The combination of the stud, o, provided with the journal the shoulder screw, c, and the double faced cam or brace, A, all arranged and operating as herein described.

54,355.—Apparatus for Washing Kaolin, Etc.—Duane Hull, Newburgh, N. Y.:

I claim the brakes, c c c, Fig. 1 and the said brakes, c c c, working on a hinge or joint, for the purpose set forth.

54,356.—Dies for Making Hatter Irons.—Bradley Hull, Westport, Conn.:

I claim the pair of dies, Figs. 2 and 3, constructed and arranged in the manner and for the purpose substantially as herein described.

54,357.—Printing Press.—Martin J. Imbach, New York City:

I claim First, The operating in a two bed printing press for printing both sides of sheets simultaneously of the beds, by means of levers, G G, so arranged and connected with the beds, that the latter will move simultaneously in opposite directions, and both give the impression at once at opposite sides of the sheet, substantially as described.

Second. The employment or use in connection with said beds of movable wrist pins, V, attached to sides and operated by eccentrics, or arranged in any equivalent way, so as to operate the levers G, in such manner as to give the necessary "dwells" or cessation of movement to the beds, substantially as and for the purpose specified.

Third. The placing of the journals of the ink rollers, A', in rods, B' pivoted to radius arms, C', and connected with springs, h, said parts being placed in such a position relatively with the forms on the platens, that the rollers may pass over the forms, and properly ink the same, substantially as set forth.

Fourth, Operating the ink rollers, A' through the medium of the rods, F, arms, C' C' a, and cams, I' when said ink rollers, thus operated, are used in combination with a press provided with two beds arranged substantially as described.

54,358.—Apparatus for Continuous Distillation.—William G. W. Jaeger, Baltimore, Md.:

I claim, First, Feeding a still by means of a feed pipe passing up therein through its bottom, substantially as shown and described.

Second I also claim discharging the heavy oils, and the residuous matter resulting from the process of distillation in a continuous flow through the bottom of a still, substantially as shown and described.

Third, I claim in distilling apparatus the following elements, or principles of operation: 1. That the heavier oils, and residuous matters are discharged therefrom as fast as they reach the bottom of the still. 2. That such matters are cooled or reduced to a comparatively low temperature before they are finally discharged or brought in contact with the atmosphere, and, 3. That the still is kept continually charged by a supply which is led up through and heated by the matters so discharged therefrom, substantially as described.

Fourth, I also claim passing the supply oil or liquid to a still through the residuum and heavy oils discharged therefrom, substantially as described.

Fifth, I also claim controlling the flow of the oils and residuous matters discharged from the bottom of a still by means of a faucet or faucets in pipes through which they pass, substantially as shown and described.

Sixth, I also claim reducing the temperature of the out going heavy oils and residuum, and increasing the temperature of the ingoing supply of oil or other liquid by running the pipe of the one within the other, substantially as shown.

Seventh, I also claim the open supply pipe, W, in combination with the pipe, S, leading from the bottom of the upper still, L, and the feed pipe, P, leading to the lower still, O, substantially as above shown.

Eighth, I also claim controlling the flow of the supply oil or other liquid into the feed pipe, P, by means of a valve, W, substantially as above shown and described.

Ninth, I also claim in combination in a distilling apparatus, the use of an open float, or floats, substantially as described, the feed pipe, P, and the vertical supply pipe, V, whose upper open end communicates with the overflow chamber, substantially as shown.

Tenth, I also claim driving off the benzine, and lighter oils and water from the oil to be distilled by means of the heat which radiates from the top of the main still and steam chamber, G, substantially as described.

Eleventh, I also claim interposing a water and steam chamber, or water and steam pipes, between the upper and lower stills for the purpose of regulating the temperature in the upper still, substantially as and for the purpose above described.

Twelfth, I claim in combination feeding oil or other liquid to a still continuously, and at a temperature made to approximate to that of the charge as described, and at the same time discharging the heavier oils and residuous matters continuously, as they are thrown down towards the bottom of the still, substantially as shown and described.

Thirteenth, I also claim in combination, the lower still, O, the upper still, L, and the water and steam chamber, G, with or without a circulating pipe, M, substantially as described.

Fourteenth, I also claim connecting the water and steam chamber, G, to the boiler, substantially as and for the purpose above described.

Fifteenth, I also claim raising the temperature and controlling the inflow of oil or other liquid, as it passes into the upper still, substantially in the manner above described.

Sixteenth, I also claim in combination, the open pipe, V, the pipes, the tube, T, and the overfloat chamber 11, substantially as described.

Seventeenth, I also claim conducting the supply of oil or other liquid into the upper still through a hot water and steam chamber, substantially as described

Eighteenth, I also claim the transparent receiving chamber, a, or equivalent apparatus to receive the heavy oils, and other matters discharged from the bottom of a still, substantially as described, with or without a gas or vapor escape pipe,

Nineteenth, I also claim the receiver, d, constructed substantially as described with a refrigerating apparatus connected thereto for cooling the matters discharged from the still before final escape, substantially as described.

Twentieth, I also claim providing the transparent chamber, and the receiver, d, one or both, with vents or vapor and gas escape pipes, b and q, substantially as described.

Twenty-first, I also claim applying a refrigerating apparatus to the pipe, Y, behind the transparent receiving chamber, a, substantially as described.

Twenty-second, I also claim in combination, the regulating faucet z in the pipe which delivers the discharged heavy oils, and residuous matters into chamber, a, the transparent chamber, a, and the trap pipe, c, substantially as set forth.

Twenty-third, I also claim in combination, the transparent chamber, a, its vent pipe, b, the trap pipe, c, and the receiver, d, substantially as set forth.

Twenty-fourth, I also claim placing a cooling device beneath the receiving chamber, a, substantially as above described.

Twenty-fifth, I also claim in combination the chamber, a, provided with a vapor or gas pipe as shown, and the trap pipe, c, or its equivalent, substantially as shown.

Twenty-sixth, I also claim in combination the chamber, a, provided with a vapor or gas pipe, as shown; the cooling device 23, and a trap pipe, c, or its equivalent substantially as shown,

Twenty-seventh, I also claim in a distilling apparatus extending the boiler upwards around the smoke stack or flue as shown at F, substantially as and for the purpose above described.

Twenty-eighth, I also claim in a distilling apparatus drawing off from the bottom of the still continuously, or as often as required, the heavy oils and residuous matters of the charge, and at the same time feeding the still as the charge is reduced, by a supply through a pipe which traverses or passes through that portion of the charge which is being withdrawn, substantially as described.

Twenty-ninth, I also claim in a distilling apparatus with continuous discharge of heavy oils, and residuum, conducting the flames and products of combustion from the fire chamber or chambers towards the center of the bottom of the still, or place of discharge, substantially as shown.

Thirtieth, I claim the use in a distilling apparatus of a float or floats made with a vent pipe as above shown, or equivalent device, either with or without a valve, substantially as above set forth.

Thirty-first, I also claim the application to a hollow float of a pipe rising therefrom with or without an outwardly opening valve, substantially as and for the purpose described.

Thirty-second, I also claim cleaning the bottom of still during distillation by means of a scraper or scrapers, operated from without, substantially as shown and described

Thirty-third, I also claim the ways, 16 and 17, severally constructed and applied as shown, for the purpose of raising the scraper from the bolt, m, on its return movement.

Thirty-fourth, I also claim placing a water jacket, 24, or equivalent device between the end of the still, and the stuffing box, 14, substantially as shown and described.

Thirty-fifth, I also claim using the overflow waste water from the condenser for raising the temperature of the fresh oil or other liquid while on its way to a still by passing the same through the water in the chamber, y, substantially as described.

Thirty-sixth, I also claim passing the overflow waste water of the condenser (after it leaves the chamber y), through a water jacket surrounding the goose neck, h, and thence through a water chamber p, between the said goose neck, h, and the overflow chamber, 11, for the purpose of re-heating it, substantially as described.

Thirty-seventh, I also claim the use of the supply chamber, 1, which receives the oil, or other liquid after it has traversed the water chamber, y, and through which the heated water from chamber, p, is led in a pipe, n, substantially as and for the purpose above described

Thirty-eighth, I also claim the double furnaces, A A, combined and operating substantially as and for the purpose described.

54,359.—Beer Faucet.—Jacob Jahraus, Buffalo, N. Y.:

First, I claim making the discharge nozzle, C, an extension of the key chamber, B, and locating the pump barrel, E, therein, in combination with the key, D, and plunger, F, arranged and operating in the manner described

Second, Extending the key passage, d', downward to each end thereof on the opposite sides of the discharge nozzle extension of the key chamber, as described.

Third, Forming the key chamber cap, G, with a cup, g', for the purpose set forth.

Fourth, The holes, h', in the key as set forth.

Fifth, The combination of the button, f2, with the perforations, f1, for the purpose set forth.

54,360.—Machine for Graining Morocco.—George R. Johnson, Wilmington, Del.:

I claim for graining morocco, a moving table and a swinging one, operating together, substantially as described.

54,361.—Animal Trap.—Samuel F. Jones, St. Paul, Ind.:

I claim the angular vibrating platform, E, treadles, F, coiled spring, v, hoops, s, catches, r, and shutter, G, when constructed and arranged in the manner and operated for the purpose substantially as set forth,

54,362.—Machine for forming Pen-holder Springs.—John Keith, Worcester, Mass.:

I claim, First, The combination of the lever, G, having cams, o p, with spindle, D, and the forming rod, E, substantially as set forth.

Second, The combination with spindle, D, and forming rod, E, of the springs, c and d, and rod, e, substantially as set forth.

Third, The combination with spindle, D, and forming rod, E, of pin, i, springs c and d, and screw, b, as and for the purposes set forth.

Fourth, The combination of the forming rod, E, with spindle, D, springs, c and d, and die I, the parts being constructed and arranged for joint operation, in the manner set forth.

54,363.—Mode of Stopping and Starting Cars.—James E. Kelsey, Providence, R. I.:

I claim First, The arrangement of the rod, N, connected above and below the fore and hind axles to their respective friction wheels, so as to give the reverse motion on the said wheels, by the same longitudinal motion of the rod, substantially as described.

Second, I claim the, S-shaped spring connecting the pawl, and the rod, N, substantially as and for the purpose described.

Third, The combination of the ratchet teeth on the wheel, B, the pawl, Q, the spring, P, rod, N, spring, T, and friction wheel, D, operating substantially as described.

Fourth, The combination of the rod, N, spring, T, and the friction wheels, D D, of the respective axles constructed and operating as described.

Fifth, The friction wheel, D, revolving by contact with the car wheel to simultaneously arrest the latter and compress the spring on the rod, n, substantially as described.

54,364.—Artificial Leg.—Hiram A. Kimball and Andrew J. Lawrence, Philadelphia, Pa.:

We claim, First, Forming a frictionless joint, d, in artificial limbs by combining pure soft rubber with vulcanized gum, in the manner and for the purpose substantially as described

Second, The two blocks, b and c, in combination with the prolongation of the pitman, p, producing two opposite points of contact, r, and r', thereby relieving the ankle pin from the strain or leverage of the foot; the same being constructed and arranged substantially as shown and described.

Third, The combination of the lever, w, with the soft packing, x, and the roller, y, for locking and unlocking the knee and lowering the toe, the several parts being arranged and constructed substantially as shown and described.

Fourth, The combination of the metallic spool, B, rubber packing D, and the steel plates, f f', to produce a slight stiff lateral motion of the ankle joint, the whole constructed and arranged substantially as shown and described.

54,365.—Method of Applying Paint to Surfaces.—John W. Kingman, North Bridgewater, Mass. Antedated April 19, 1866.:

I claim the application of paint in form of a wash, or mixed with water, and the applying oil over it, before it has become dry, substantially as herein described.

54,366.—Sorghum Evaporator.—T. T. Kneeland, Tecumseh, Mich.:

I claim the pan, A, provided with a series of steam pipes, B C, in combination with the gate, D, all arranged to operate in the manner, substantially as and for the purpose herein set forth.

[This invention relates to a new and improved device for evaporating, by means of steam, the juice of the sugar cane, more particularly, the juice of the kind of sugar cane termed sorghum. The invention consists in the employment or use of a series of steam tubes, fitted within a shallow pan, provided with a gate, all arranged in such a manner that the juice may be evaporated expeditiously, and the necessary manipulation performed with the greatest facility.]

54,367.—Sewing Machine Guide.—Edward H. Knight, Washington, D. C.:

I claim an adjustable spring pressure pin or foot, constructed substantially as described, and adapted to press, at one point, upon the cloth outside of its line of seam, to deflect the same, but not by extreme pressure or penetration, to form a center of revolution.

I also claim the said spring pressure pin or foot as adjustable in a horizontal plane, substantially as described.

54,368.—Land Roller.—E. J. Knowlton, South Lyon, Mich.:

I claim, First, A land roller composed of two parts, C C, having the inner or adjoining ends of their axles fitted in an adjustable bearing or bar, D, substantially as and for the purpose set forth.

Second, the lever, I, in combination with the bar, D, substantially as and for the purpose specified.

Third, The plank or seat support, E, in combination with the bar, D, and rollers, C C, arranged substantially as and for the purpose set forth.

[The object of this invention is to obtain a roller for rolling land which will be capable of conforming to the inequalities of the surface thereof, and also capable of being more readily turned than usual.]

54,369.—Pegging Jack.—George A. Knowlton, Natick, Mass.:

I claim the heel standard, D, made adjustable vertically; for the purpose set forth.

I also claim the spindle, i, substantially as and for the purpose described.

I also claim the lever, I, operating substantially as and for the purpose set forth.

I also claim connecting the lever, F, with the lever, I, by means of adjustable rods, G H or their equivalents, substantially as and for the purpose specified.

I also claim a heel standard, made adjustable vertically, as well as horizontally, in combination with a toe standard, made adjustable horizontally, substantially as and for the purpose described.

54,370.—Clover Harvester.—Elias Kramer, Alvira, Pa.:

I claim the spirally-arranged revolving shears, H H, in combination with the fingers, O, when curved on their upper faces, and having openings at their faces, substantially in the manner and for the purpose set forth

Second, In combination with the wheel, Q, adjustably attached to the box, C, so as to regulate the hight of the cut on the outer side, I claim the brace and guard, N, when adjustably attached to the axle of the wheel Q, by a slot and nut, substantially as and for the purpose set forth.

Third, In combination with the braces, D D', hinged as described, I claim the cords, M M', and hand lever, L, substantially as and for the purpose set forth.

54,371.—Sheep Rack.—S. Lahm, Canton, Ohio:

I claim the arrangement of the hinged covers, F, hinged rack, or rack boards, G G', and hinged or sliding sides, E E', with regard to said racks, and the grain troughs, H, so that the food may be appropriately distributed, and the sheep rack opened or closed, in whole or in part, as herein described, and for the purpose set forth.

54,372.—Harvester.—E. M. Krum, Nassau, N. Y.:

I claim hinging the finger beam of the cutting apparatus to the draft frame by means of eye bearings formed directly on the inner shoe, F, the crank shaft which drives the sickle and pendant brackets, E E, which afford tubular bearings, pivots for the finger beam, both at front and rear of the cutting apparatus, substantially as described for the purpose set forth.

The combination of the inner hinged shoe, crank shaft and inclined jointed shaft, D, the said parts being constructed and arranged, and operating substantially as described.

Supporting the upper end of the inclined shaft, D, in a jointed bearing box, m, when this shaft is connected to the horizontal crank shaft, D', by a universal coupling, g, substantially as described.

The construction and arrangement of the tubular pivots, h h, pendants, E E, shoe, E, for the purpose of supporting a horizontal crank shaft, substantially as described, and for the purpose set forth.

The arrangement of the pitman box, j1', so as to be tightened by the end of the pitman, j, setting against a half bearing box, h, substantially as and for the purpose shown and described.

The segment, J2, on the finger beam, G, in combination with the segment, J1, in the hand lever, J, and chain for enabling the attendant to adjust the finger beam to a vertical position, substantially as described.

54,373.—Barnyard Scraper.—Samuel W. Langdon, Fairfield, Iowa:

I claim the invention of the foregoing machine, and the combination of its different parts, as set forth above, and as shown by the accompanying drawings.

54,374.—Reaping and Mowing Machine.—Hiram R. Lavey, Bristol, Wis.:

I claim the arrangement of the spur wheels, E F, and adjustable pinions, G H, when constructed and operating, substantially as herein specified and shown.

I claim the combination and arrangement of the spur wheels, E F, pinions, G H, levers, I J, and spring, h i, operating substantially as and for the purpose shown and described.

I claim, in combination with the above the employment of the braces, f g, as and for the purpose specified and described

I claim the arrangement of the adjustable pinions, G H, provided with the stops, b c, with the shaft, K, provided with the projection, a, operating substantially as specified and shown.

I claim the combination of the slotted arm, r, slotted arc, s, support, p, and key, q, arranged and operating as specified and shown.

In combination with said adjustable support, p, I claim the arrangement of the drum, m, and sliding bar, n, and reel, o, arranged and operating as specified.

54,375.—Enveloping Hemp or Flax, or Flax Waste within a Sliver of longer Staple.—John Leinweber, Louisville, Ky.:

I claim the mode of enveloping the waste of hemp or flax in a sliver of a longer staple, substantially as set forth.

The provision in, or attachment to, a hemp or flax carding machine of the flock feeding and distributing mechanism, I J K L, substantially as described.

The flock feeder, capable of being partially rotated upon the shaft, H, for access to the delivering mechanism, in the manner explained.

54,376.—Annealing Box.—James E. Lewis, Sharpsburg, Pa.:

I claim constructing cast iron annealing boxes, as described, having the body of the box in a separate piece from the bottom and top, or cover, for the purpose of preventing its warping by the action of the annealing oven.

54,377.—Die for making T-head Bolts.—William J. Lewis, Pittsburg, Pa.:

I claim constructing the gripping dies of bolt-heading machines, with a double or single recess in the front, or that part farthest from the header, in addition to the one in which the header works, whereby the bolt head may be worked into proper shape by submitting it alternately to the action of both sides of the gripping dies.

I also claim the mode herein described for driving the pin off the bolt head, that is to say, first staving the rod to form the head and subsequently, compressing it laterally so as to throw the flash or pin, produced in staving, in a line with the path of the header, so that on submitting the head to the action of the header a second time, the pin will be driven into the body of the bolt

I also claim parting or separating the gripping dies on one side of a right line drawn longitudinally through the center of the header, so that the cylindrical hole, will be deeper in one die than the other, for the purpose of overlapping and driving off the pin produced on one side of the bolt by simply turning it one-half way round to bring the opposite side into the deepest recess,

54,378.—Washing Machine.—Elijah A. Lucas, Bloomington, Ill.:

I claim communicating a rotary motion to the shaft, C, of a washing machine, from a vibrating segment, E, by means of a double rack bar, D, substantially as described.

Second. The combination of the pinion, d, on the shaft, C, the pinion, J, on frame, E, and the wheel or segment, F, with a bar, D, having teeth on two of its sides, in the construction of a washing machine, substantially as described.

54,379.—Jaw for Brooms and Gaff of Vessels.—Alfred Manning, Fair Haven, Conn.:

I claim the combination of the iron hinges, with the jaws, when each jaw is made in two parts, and the whole is constructed, arranged, and fitted for use, substantially as herein described and set forth.

54,380.—Stirrup.—Frank N. Martin, Cincinnati, Ohio:

First, I claim a stirrup composed of two distinct members, D E, and D E', hinged together at their upper portions, substantially as set forth.

Second. In this connection the rings or recessed portions, E E', for the reception of pads, in the manner stated.

Third, the use of a spring clasp, Fig. 3, in the manner set forth.

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54,381.—Gate.—Joseph Martin, New Oxford, Pa.:
First, I claim the arrangement of levers, j j2, beneath the latch, h, which is used to hold the gate open, in combination with the pull ropes, S S2, and overhanging beams, E F, substantially as described.
Second, The combination of levers, r' K', ropes, K r, beam, H, and pull ropes, S S1 S2, with the levers, j j1, and latch, h, substantially as described.

54,382.—Solution to be applied to Cotton, Linen, and other Fabrics, to prevent them from burning.—John McGill, Boston, Mass.:
I claim the application of the aforesaid chemical to all combustible substances, materials, and fabrics, as in the above manner, and for the purpose set forth.

54,383.—Lock.—W. C. McGill, Cincinnati, Ohio:
I claim the plate, D, and springs, d, operating and constructed as and for the purpose heretofore described.
The plate, D, springs, d, and tube E, constructed and operating substantially as above described, and for the purpose set forth.

54,384.—Curtain Fixture.—Edward Mentz, Philadelphia, Pa.:
I claim the bracket, G', having in it the recess, P, and pulley, arranged substantially as described.
The centrally divided roller, B, secured upon the shade, A, by screws, c, in combination with the end pulleys, D D', substantially as described.
I claim operating a window shade by a cord, t, passing round pulley, D', on one side, over pulleys, m m, in the head, and down the other side round pulley, D, substantially as described.

54,385. Window Blind.—Seth W. Merrill, Assabet, Mass.:
I claim the application of the connection bar, D, to the several slats at or near their ends, and so as to be capable of not only being moved up and down with them, but being turned over against the rear face of the contiguous side bar of the frame, in a manner, and so as to hold the slats open, as specified.

54,386.—Folding Table.—Frederick Mohr, Fond du Lac, Wis.:
I claim the leg, D D' C C', when constructed and operating, substantially in the manner and for the purposes set forth.
The combination and arrangement of the leaves, A A', center piece, B, and legs, D D' C C', substantially as and for the purposes set forth.

54,387.—Step Ladder.—Abner Moore, Jr., Hillsboro, Ohio:
I claim the slide, C, in combination with the arms, D, legs, B, and side pieces, A, substantially as specified.

[This invention consisists in constructing a step ladder, with slots made in or through and parallel with the side pieces, into which are fitted slides, connected by strips or arms, to the legs of the ladder and so arranged that when the legs are drawn from or pushed toward the ladder, the slide will work in the slot, whereby the legs can be drawn out from the steps, for a shorter or longer distance, as may be desired, and be braced without the use of hooks, or further manipulation than the mere act of drawing them out or pushing them toward the steps.]

54,388.—Egg Beater, Cake Cutter, and Nutmeg Grater.—Samuel C. Moore, Boston, Mass.:
I claim a case provided with a movable central shaft with radial spikes or pins, arranged spirally in the shaft forming an egg beater, substantially as described
In combination with the egg beater above claimed, I claim the extension of the case at the lower end, forming a cake cutter, substantially as described.
And in combination with the egg beater and cake cutter described, I claim the nutmeg grater, arranged in the outer bottom, as described.

54,389.—Apparatus for Preparing Nitrous Oxide Gas.—Charles H. Moseley, Brooklyn, N. Y.:
I claim the combination of the portable box, A, with a set of nitrous oxide gas purifier jars, arranged and operating as herein before set forth.
I also claim in combination with the beak of the generating retort an elastic india-rubber or other non-conducting collar, K, for the purposes herein before set forth.
I also claim the method of suspending the retort by means of an elastic tube attached to the end of the beak of the retort whereby I am enabled to dispense with the use of a retort stand, as hereinbefore set forth.

54,390.—Table Cover.—Albert L. Munson, New Haven, Conn.:
I claim a table cover made of paper, whether strengthened with cloth or not, ornamented substantially as described and for the purpose set forth.

54,391.—Broom Head.—G. R. Nebinger, Lewisberry, Pa.:
I claim a broom head consisting of the loop, C, constructed as shown and described, and used in combination with the handle, A, and cap, B, provided with the sleeve, b, all arranged and operating as herein set forth

54,392.—Machine for Raking and Loading Hay.—Foster Nevergold and George Stackhouse, Pittsburg, Pa.:
We claim the arrangement of the pitman, y, rocking shaft, w, and sliding bearings, r r, in combination with the pinion, l, sliding rack, m, and pitman, p, operating so as to impart a compound motion to the elevating rake, substantially as herein set forth.

54,393.—Animal Trap.—William H. Newby, Seymour, Ind.:
I claim the arrangement of the door, L, and spring, M, in combination with the tilting platform, R, the trap door, H, lever rod, C, and catch, q, constructed and operating in the manner and for the purpose herein specified.

54,394.—Oiler.—L. H. Olmstead, Stamford, Conn.:
First, I claim providing an oiler with an internal rod or tube, placed in line with the main discharge tube, and adapted to limit the movement of the flexible part of the can by coming directly in contact with the discharge tube in the manner and for the purpose herein specified.
Second, In combination with the internal tube, A, I claim a bearing or guide therefor, formed in and on the bottom of the can, substantially as described.

54,395.—Reed Musical Instrument.—Isaac T. Packard, Chicago, Ill.:
I claim an octave coupler for reed musical instruments, constructed with the levers, B and C, the fulcrums of which are at or near their rear ends, and their connection with each other is between their fulcrums, and the keys and tracker pins, upon which they operate.
Second, I claim the movable spring rail, H, when constructed and operating substantially as, and for the purpose herein set forth.

54,396.—Harvester.—Aaron Palmer, Brockport, N. Y.:
I claim, First, Forming a movable, self-adjusting, single joint to connect the finger beam, by the medium of the shoe, E, to the hanger, C, without an intervening gate, by means of the grooves, g g, and pins, h h, or equivalent, when the said arrangement is used in combination with the pitman, M, passing through the axle of the grain side wheel, to operate the cutter, substantially as set forth.
Second, I also claim raising the finger bar from the ground, by the forward motion of the machine, by throwing the weight of said finger beam upon the periphery of the wheel, or upon an auxiliary rim of the same, by means of a connection, O, that connects it with any suitable machanical arrangement for producing contact with the wheel or rim, substantially as described.
Third, I also claim a brake lever, P, and brake, p, in combination with a finger bar, O, and supporting wheel, A', in such a manner that the driver can raise the finger beam by merely bringing the rake in contact with the wheel, substantially as specified.
Fourth, Making the main frame, B, of a two wheeled harvester, tubular, to secure tightness and strength, and to allow the passage of the pitman, said frame being stationary or non-revolving and having the wheels turning on each end, substantially as described.

54,397.—Harvester Crank Motion.—Aaron Palmer, Brockport, N. Y.:
I claim retaining the box, H, upon the crank pin, i, by means of the groove and flange, k l, arranged and operating substantially as described.
In combination with the box, H, and crank pin, i, I also claim the chamber, I, fitted with fibrous or other suitable packing, m, substantially as specified.
I also claim the revolving oil chamber, h, secured to the top of the balance wheel, in combination with the revolving shaft, A, and stationary box, c, substantially as and for the purpose herein set forth.

54,398.—Stump Extractor.—Nathan Parish, Kalamazoo, Mich.:
I claim the arrangement of the lever, D, circular bar, E, ratchet, C, shaft, B, pawls, F F', and tackle, H, relatively to each other, and operating in the manner as described.
Second, I claim the movable bent, L, in combination with the lever, D, arranged and operating independently of the shaft, B, in the manner and for the purpose herein described.

54,399.—Pump.—John S. Patric, Victor, N. Y.:
I claim the cups, D E, one or both, in the formation of the piston head, constructed and arranged with the envelope, i, and operating substantially in the manner and for the purposes set forth.

54,400.—Cooking Stove.—Samuel Pierce, Cambridge, Mass.:
I claim, First, The combination of the flue, F, when placed over the fire box, A, with the said fire box, and with flues, E, by means of dampers, h, operating substantially as described, and for the purpose stated.
Second, The air flues, G, formed of the double oven plates, passing over and round the oven, and behind the fire box, enabling the current of air flowing in them to be intensely heated, so as to heat the interior oven plates behind the ash pit, and render equable the atmosphere of the oven, by discharging the hot air through holes, thus ventilating the oven.
Third, The combination of the air flues, G, with their holes, e, as just described, and with the oven, O, with holes, f, and flue, H, behind the fire box, having its holes at g, in the fire box, to make the hot blast, and effectually consume the gasses, substantially as described.
Fourth, The holes, g k, at the back of the fire box, above and below the outlet thereof, arranged and combined with respect to the combustion chamber over the fire pot, substantially as and for the purpose described.
Fifth, Forming the bottom and back of the stove of double plates with an inner space, when the inerior one of such doubled plates is pierced with holes, l, as drawn, for the purpose of having ashes drift through said holes and between the plates, to form a non-conducting back and bottom, substantially as described.

54,401.—Piano Seat.—Lewis Pastawka, and Anton Krasinski, Boston, Mass.:
We claim, First, The combination of seat, h, and its standards, n, with frame or stand, a, and wheel, p, all constructed as described, so that the seat may be raised or lowered by screw or wheel, as specified.
Second, The whole piano seat constructed in the manner and for the purposes set forth.

54,402.—Peat Machine.—Nathaniel F. Potter, Providence, R. I.:
I claim, First, The use of one or more receiving and delivering pockets, F, in combination with a tempering mill, substantially as described, for the purposes specified.
Second, Combining with a mill for tempering peat or other material a scraper, G, operating in the manner described, for the purposes specified.
Third, Double set of driving gears, d d' e e,' and the clutch, f, when the same are combined with the sweep of a tempering mill, substantially as described.

54,403.—Grain Separator.—T. J. Price, South Union, Ky.:
I claim the combination of the rockers, B B, with a fanning mill, as and for the purposes specified.

54,404.—Paper Collars, Etc.—George W. Ray, Springfield, Mass.:
I claim as a new article of manufacture, paper, embossed and enamelled whether before or after its conversion into articles of wearing apparel, all substantially as herein described.

54,405.—Machine for Bending Wood.—James N. Ray, Indianapolis, Ind.:
First, In a machine for bending wood, I claim the former, A, Figs, 1 and 2, when constructed as herein described, and operated as herein set forth.
Second, I claim the combination of the former, A, the strap, S, the nib, N, the clamp, C, and the wedge, W, whether the wedge be used as shown at W or at O, substantially as and for the purposes herein set forth.

54,406.—Harvester Rake.—Adam R. Reese, Phillipsburgh, N. J.:
I claim the combination in a two wheeled hinged joint of the verical rake shaft, mounted upon the finger beam and driven from the main frame with the cam ring and rake arms, when arranged and operating as described, whereby I am enabled to locate the driver's seat outside of the path described by the rake arms, as set forth.
I also claim in combinationof the finger beam and main frame with the tubular, x, shaped frame, G G', as described, for the purpose of supporting and bracing the rake shaft.

54,407.—Wind Mill.—Lewis Reese, Rolling Prairie, Ind.:
I claim the combination and arrangement of the lever M, cords, b c, weighted vessel, Q, and vessel, R, operating substantially as and for the purpose specified.

54,408.—Paper Shirts.—Helen M. Remington, Springfield, Mass.:
I claim, First, As a new article of manufacture, a paper shirt
Second, Forming the same materials composed of two thicknesses of paper, prepared by the insertion of the compounds described, or their equivalents, substantially in the manner and for the purpose described.
Third, In combination with the saidshirt threads, a a, etc., applied substantially as set forth.
Fourth, The hook, b, constructed and combined with the shirt, substantially in the manner and for the purpose set forth.

54,409.—Furnace.—George E. Reynolds, Philadelphia, Pa.:
I claim a detachable block, H, adapted to the fore plate of a furnace, substantially as and for the purpose herein set forth.

54,410.—Carriage.—Uel Reynolds, New York City:
I claim the pivot, i, and socket, K, applied substantially as specified, between the axle and head block, in combination with the brace, m, and pivot, o, substantially as and for the purposes specified.

54,411.—Elastic Chain.—Celins E. Richards, North Attleboro, Mass.:
I claim my improved elastic link (or chain, composed of a series of such links), the same having its parts, A B C', constructed, arranged, and applied together, and so connected as to operate when applied to a cable, substantially in manner as set forth.

54,412.—Method of Extracting Precious Metal from Ores.—Van Buren Ryerson, New York City:
I claim the process of decomposing the sulphurets found in admixture in the ores of gold and silver, by subjecting said ores in the pulverized or granulated state, to the action of superheated steam, so as to convert the sulphurets in sulphates and sulphites, substantially as and for the purpose described.
And I also claim, in combination with the said process for decomposing said ores, the process substantially as herein described, of amalgamating the particles of precious metals with mercury.

54,413.—Atmospheric Hammer.—John Robertson, New York City.:
First, I claim, in combination with the cylinder hammer head and piston, applied and operating as herein before specified, the provision for raising and lowering the piston rod, and shortening or increasing its effective length while the hammer is in operation, substantially as herein set forth
Second, I claim, in comoination with the hammering apparatus, constructed as described, a variable crank, substantially as shown.

54,414.—Apparatus for Refining Petroleum.—William H. Sangster, Buffalo, N. Y.:
First, I claim the partition, A, or its equivalent, when coustructed as and for the purpose herein substantially described and set forth.
Second, In combination therewith, the plate B, or the equivalent thereof, as and for the purpose describe l.

54,415.—Grate Bar.—Horace B. Scofield, New York City,:
I claim a grate bar for furnaces, formed with a straight upper surface, and a rib on its under side, corrugated in the manner and for the purposes specified.

54,416.—Frame for Printing Photographic Pictures.—T. E. Sexton, Wilmington, Del.:
I claim as a strip, F, applied to and rendered adjustable in a photograph frame, substantially as and for the purpose herein set forth.

54,417.—Filter for Well Tube.—William A. Sharpe, Syracuse, N. Y.:
First, I claim the rings, A A, having the parts, e e, attached for the purpose described.
Second, The combination of the rings, A A, and frame work, B B C D, substantially as described.

54,418.—Apparatus for Raising Water by Waves.—A. N. Shattuck, San Francisco, Cal.:
I claim the buoy pump made to act by the agitation of the water, substantially as above described, consisting of a floating vessel, A, its tube, B, combined with a fixed tube, C, both tubes being provided with check valves, and the floating vessel, A, being guided in any suitable frame, as above set forth.

54,419.—Hoisting Apparatus.—Henry F. Shaw, West Roxbury, Mass.:
First, I claim the general combination and arrangement of the differential pulleys and chains, substantally as described, and for the purpose set forth,
Second, The latch, I, or its mechanical equivalent, working as described, and for the purpose set forth.
Third, The holding pin or lock, H, or its mechanical equivalent, in combination with the driving pulleys, R and S, substantially as described and for the purpose set forth.

54,420.—Pump.—John W. Sheaffer, Sterling, Ill.:
I claim the valve boxes, L and J, provided with the hook, N, and bail, O, when constructed and operating substantially as and for the purposes set forth.

54,421.—Harrow and Cultivator Combined.—A. S. Sheffer, West Donegal Township, Pa.:
I claim the specific combination of the adjustable handles, F, on the side pieces, A, also made adjustable at the apex, by bolts, H I, and central jaw piece only, together with the arrangement of the curved flat and narrow shares or spikes, s, inverted and operated in the manner shown, and for the purpose specified.

54,422.—Fruit Basket.—P. R. Shelton, Prattsburg, N. Y. Antedated April 21, 1866:
I claim a fruit basket, made substantially as herein described.

54,423.—Steam Engine Governor.—David Shire, Philadelphia, Pa.:
I claim suspending the balls, A A, by rigid arms, h h, connected to the spindle, B, by means of joints, consisting of the cylinders, f f, and the mandrels, g g, or their equivalents, arranged in relation to the said spindle, arms, and bolts, substantially as described and represented.

54,424.—Fluid Regulator.—Warren A. Simonds, Boston, Mass.:
First, I claim the combination of the cone, f, and rod, g, as and the purpose described.
Second, The arrangement of the bevel gear, o and p, with the shaft, i, and valve stem, substantially as described, and for the purposes stated.
Third, The arrangement of the guide finger, r, with the slotted valve stem to prevent rotation of the valve or stem.

54,425.—Land Roller.—Albert S. Skiff, Trenton Falls, N. Y.:
I claim the construction of a land roller in sections, one section in advance of the other, and the frame in sections, connected by pivot joints, and so arranged as that the bearings of the inner ends of the rollers are supported by the opposite frame, thereby allowing the ends of the rollers to lap, as and for the purposes described.
Second, The use of the pivoted journal box, in combination with the frame and roller journal, as and for the purposes set forth.

54,426.—Composition for Painting Metallic Roofs.—C.D. Smith, Chicago, Ill.:
I claim as a new article of manufacture, a composition made of petroleum oil, coal tar, asphaltum, gum shellac, india-rubber, and benzine, prepared in the proportions and manner as above described and for the purposes specified.

54,427.—Cooking Range.—Mrs. O. Smith, Chicago, Ill.:
I claim the combination of the fire boxes, U T, with the ovens, R Q S 13 13, when the latter are arranged in relation to the former, and to each other, as shown and described.

54,428.—Revolving Condenser.—James F. Spence, Williamsburgh, N. Y.:
First, I claim a revolving condenser, constructed and applied in combination with a steam cylinder, substantially in the manner herein described, for the purpose specified.

54,429.—Process for Tempering Steel.—Ariel B. Sprout, Hughesville, Pa.:
I claim the use of a saponaceous or alkaline liquor, covered with a coat of oil, and heated to about the boiling point, and regulated and graduated in its strength to suit the different kind and quality of steel, article, or thing, to be tempered, substantially as herein described and set forth.

54,430.—Horse Rake Teeth.—A. B. Sprout, Hughesville, Pa.:
I claim constructing of steel or iron, a curved tooth for horse rakes, said tooth being a spring within itself, and tapering from the line, B, to the line, C, from the line, B, to the line, A, substantially as herein described and for the purpose set forth.

54,431.—Horse Hay Forks.—Ariel B. Sprout, Hughesville, Pa.:
I claim constructing and arranging the bars, A and B, in such manner that they may be used, either for elevating hay, or as hay shears, substantially as herein described.

54,432.—Head Blocks to Saw Mills.—J. M. and S. F. Stanton, Manchester, N. H.:
First, We claim the operating of the uprights or knee pieces, C, through the medium of pinions, D, gearing into racks, b, at the under side of the knee pieces and into the racks, c, of the blocks, B, substantially as and for the purpose specified.
I claim the arrangement of the sectional shaft, E, clutches, F, lever, G, rod, d, constructed and operating in the manner and for the purposes herein described.
The combination of the lever, Q, notched guide, R, pawl, P, pinion, D, rack, b, and rack, c, all arranged in the manner and for the purpose herein specified.

54,433.—Horse Power.—Nicholas Starr, Jr., Homer, N. Y.:
First, I claim the arrangement in the large reel, of placing the spokes in pairs, and connecting them by eross pieces which shall extend beyond the spokes, as and for the purposes described.
Second I claim the weighted lever, l, in combination with the pulley, m.
Third, I claim the adjustable cap piece, f, in combination with the pulley, m, and lever, b, substantially as described.
Fourth, I claim the combination of the wheel, G, cone R, and reels, p p, when the same are arranged and operated substantially as above described.

54,434.—Curtain Fixture.—J. Stephens and W. B. Fay, Chicopee Falls, Mass.:
We claim as a new manufacture the spool, a, having a beveled periphery, b, in combination with the grooved lever pawl, c, substantially as herein described and set forth.

54,435.—Hay Fork.—Joshua B. Stewart, South Paris, Maine:
I claim a hay fork having a spring balance or weighing attachment applied to it in the manner, substantially as and for the purpose herein set forth.

[This invention consists in the application of a spring to a hay fork, in such a manner that it will serve as a balance or scale to indicate the weight of the hay taken up on the fork, so that a person, in loading a wagon or cart, or in pitching a given quantity of hay from one spot to another, may ascertain the weight thereof. The invention is more especially designed for farmers and others, who fre-

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quently dispose of small quantities of hay—"jags"—and who at present simply guess at the weight, when hay scales are not convenient.]

54,436.—Portable Deflector for Car Windows.—J. C. Stoddard, Worcester, Mass.:

First, I claim a portable air and dust deflector, constructed and operating as set forth.

Second, The combination with the body of the deflector, of a hook at the top, and spring at the bottom, for retaining the same in place, substantially as set forth.

Third, The combination of the piece, F, and elastic spring, G, with the metal back, E, flanges, c c, and loop, J, substantially as shown and described.

54,437.—Cheese Box.—Conrad Stoll, Mokena, Ill.:

First, I claim the combination of the circular revolving support, M, with a cheese box, substantially as herein described, and for the purpose set forth.

Second, A cheese box, constructed and arranged substantially as herein described, and for the purpose set forth.

[The object of this invention is to furnish a cheese box by means of which the cheese may be kept free from dust or insects, and by means of which any desired part of the cheese may be turned to the front or open part of the box, for convenience in cutting. And it consists in pivoting to the stationary bottom of the cheese box a circular revolving support or platform, upon which the cheese is placed. The front, top, and sides are so constructed as to be opened sufficiently for cutting the cheese, and the sides of the box are formed of alternate panels of glass and fine wire gauze, to admit the air and light, and yet exclude all insects, dusts, etc.]

54,438.—Submarine Explorer.—William Mont Storm, New York City:

First, I claim the hinged or "toggle" bolts with their clutching jaws and binding nuts, all combined and operating substantially as described for fastening in place the scuttle, O, and trap, Q.

Second, I claim the application of the three pressure gages, J K L, prepared and applied in the manner and for the purpose described.

Third, I claim the lookouts, F, constructed substantially as described, and combined with a water-tight lens, f, as described.

Fourth, I claim making the ballast ring of my explorer compound, to wit: of a permanently fixed portion, E, combined with a series of removable portions or sections, E', in the manner and for the purpose set forth.

Fifth, I claim the air purifying lining, R R', to the working chamber of my explorer, constructed and operating substantially as described.

Sixth, I claim the combination of the annular sprinkler, h', cock, g', and pipe, i', operating together as described for the purpose described.

Seventh, I claim the application in conjunction with the lookouts, F, or their equivalent, of the deflectors, V, in the manner and for the purpose described.

Eighth, I claim in combination with my purifier, the water space at its bottom and the cock, S, constructed and operating in the manner and for the purpose described.

54,439.—Adjustable Cut-off and Horse-power Indicator.—Albert Stuckenrath, New York City:

First, I claim the right and left-handed screws, g g', rod, h, index, j, and dial, K, in combination with the cut-off valves, E E', and main valve, C, constructed and operating substantially as and for the purpose described.

Second, The dogs, l, levers, m, and arms, O, in combination with the cut-off valves, E E', and main valve, C, constructed and operating substantially as and for the purpose set forth.

54,440.—Machine for Bending Tubes.—James Sweney, St. Louis, Mo.:

First, I claim the combination of the beam, A, having a mortise, a, in it, with the screw, f, when constructed as and for the purpose set forth.

Second, I claim the sheaves, d d, in combination with the chain, g, or its equivalent, and the screw, f.

54,441.—Planing Machine.—Sylvanus J. Talbott, Milford, N H.:

I claim the sliding frame, P', swinging frame, F', and connecting bar, R', constructed as described in combination with each other, and with a board matching machine, substantially as and for the purpose set forth.

54,442.—Magnesium Lamp.—Robert H. Thurston, Providence, R. I.:

First, I claim the use of the feed roller, B, as a surface on which to burn a strip or wire of magnesium, substantially as described.

Second, The combination of the stationary scraper, K, with the roller, B, substantially as described and for the purposes specified.

54,443.—Spring Bed Bottom.—Lyman S. Tingley, Pawtucket, R. I.:

I claim connecting the tops of the several springs of a spring bed bottom, by a cord going loosely through eye bolts in the inside faces of the frame, A, substantially as described.

I also claim adjusting the springs of a bed bottom so as to prevent unevenness when there is a disparity in the weight of its occupants, substantially as described.

I also claim the heart plates, K, in combination with the inside slotted bars, J, on each end of the frame, substantially as and for the purpose described.

[The object of this invention is to improve spring bed bottoms, and the invention consists in several particulars, one of which is making it capable of being folded, for convenience of carriage and storage along the middle of its length; another is adjusting the springs to a greater or less tension on either side, or half of the bed independent of the other side, so as to keep both sides at about the same elevation notwithstanding any difference in the weight of the occupants; another is connecting the tops of the springs by a system of cording to keep them vertical: another is taking the strain, when the bed is occupied, off the hinges, by means of heart plates, interposed between two of the bars, that serve to adjust the tension of the springs.]

54,444.—Flour Barrel.—William H. Towers, New York City:

I claim a flour barrel provided with a sieve agitator and sliding cover, arranged and operating substantially in the manner and for the purpose above set forth.

54,445.—Shuttle and Bobbin for Looms.—Clemens Unverzagt, Richmond, Ind. Antedated April 30, 1866:

First, I claim a shuttle with a projection or rib upon one side, substantially as and for the purpose set forth.

Second, The lever spring, c, in combination with the beveled or conical head of the bobbin, B, when attached to a shuttle, in the manner and for the purpose described.

Third, The bobbin, B, provided with a conical head, c, substantially as and for the purpose described.

Fourth, The combination of the shuttle, A, projection, D, spring, E, and bobbin, B, all substantially as and for the purposes set forth and described.

54,446.—Straw Cutting Knife.—Grey Uttley, Petersburg, Va.:

I claim the construction of the blade of the knife, having the angular and vertical grooves on its face, to form the diagonal shaped teeth, as herein described and for the purposes set forth.

54,447.—Base Burning Stoves.—Jasper Van Wormer and Michael McGarvey, Albany, N. Y.:

First, We claim an adjustable feeder, whereby the supply of coal may be increased or diminished, by raising or lowering the mouth of the feeder from or toward the grate of a stove, substantially as described and for the purpose set forth.

Second, The combination of an open flue extending entirely around the fire pot, and the outer shell of the stove with a magazine or feeder, as described and for the purposes set forth.

54,448.—Horse Rake.—Joshua A. Varney, Alton, N. H.:

First, I claim the shaft, I, provided with bars, K K, and shafts J J, in combination with the lever, F F, arranged and applied substantially as shown and described, for raising the rake teeth so that they may discharge their load.

Second, The rollers, d, in the lower ends of the rake teeth, E, substantially as and for the purpose specified.

Third, The combination of the bars, D, with the teeth, E, attached, and fitted on the rod, c, the shafts, I, J J, bars, K K, and levers, F F, all arranged on a mounted frame, to operate in the manner substantially as and for the purpose set forth.

[This invention relates to a new and improved means for elevating the rake teeth, so that they may discharge their load, and also in a novel arrangement of the rake teeth, and in the application of rollers to the lower ends of the same, whereby it is believed that a superior horse rake is obtained, one which may be manipulated with the greatest facility, possess no parts liable to get out of repair, and which will not scratch up the earth and render the hay dusty, as is now the case, especially with the wire tooth rake.]

54,449.—Device for elevating straw from Thrashing Machines.—Gerret Vedder, Battle Creek, Mich.:

First, I claim the means substantially as herein described and shown, for leveling the straw carrier or stacker of thrashing machines.

Second, The combination of the spur wheels, f f', and ratchet wheels, g g', with the adjustable spur wheel, K, and the winding drums, d d', separated and independently arranged and operating in conjunction with an adjustable straw stacker, substantially as described.

54,450.—Cards for Carding Machines.—Enoch Waite, Franklin City, Mass.:

I claim the improved manufacture of wool cards as made with its body or teeth, supporting part composed of layers of paper and cloth arranged and cemented together, substantially as specified.

54,451.—Corn Planter.—Elias M. Walker, Gallatin, Mo.:

I claim the peculiar manner in which corn planters are constructed as described in these drawings and specifications.

Second, The manner in which the plow-stock, corn-box and slide are combined, as described in the drawings and specifications.

Third, The manner in which the treadles are applied, combining the device of dropping by the foot or by the action of the wheels.

54,452.—Machine for Making Horse Shoes.—Washington Wallick, Philadelphia, Pa.:

First, I claim the combination of the lever, G G' H, and the bending and cutting die, m, constructed and operating as described.

Second, The jaws, P and P', and the former, O, for compressing the sides of the shoe, constructed and operating as described.

Third, The creaser and presser, R, in combination with the die, m, the jaws, P and P', and the former, O.

Fourth, The mechanism for discharging the shoe, consisting of the lever, G G' H, the pieces, S S' and t, and the reacting spring arranged and operating as described.

54,453.—Gang Plow.—W. M. Watson, Tonica, Ill.:

I claim the combination in a gang plow of the hinged braces and bolts, e e e e e, or their equivalents, and side seat and support, n, m, K, all arranged substantially as and for the purpose set forth.

54,454.—Rock Drill.—Charles Hunter Webb, San Francisco, Cal.:

I claim the arrangement at an angle of 45 deg. of each end of the back of the cutters or dies, together with the arms or guides thereof, at the same angle of 45 deg. of each edge of the wedge by which the cutters or dies are driven at its points of contact with the cutters or dies, and also at the same angle of 45 deg. of the various slots in which the cutters or dies are made to traverse in their propulsion by the blow toward the rock and their recoil therefrom, each separately and the whole collectively for the purpose described, namely the effective delivery of the blow with the least amount of friction.

54,455.—Machine for Finishing the Ends of Pen Handle Tubes.—Samuel Wesson, Worcester, Mass.:

I claim the combination and arrangement of the external and internal holders, A B, and the cutter, F, the latter and the internal holder being movable and provided with mechanism for operating them, substantially as described.

54,456.—Centrifugal Machine for Draining and Cleansing Sugar.—Charles O. West and John Carey, Martinsville, Ohio:

First, We claim making the screen of a centrifugal sugar mill, in the form of a frustum of a hollow cone for the purpose described.

Second, The distributing head in combination with the screen of a centrifugal sugar mill.

Third, The adjustable hopper in combination with the screen of a centrifugal sugar mill.

Fourth, The induction pipe, K, in combination with a centrifugal sugar mill for cleansing the sugar by steam.

54,457.—Cross Head.—John West, Bethlehem, Pa.:

I claim the within described cross head consisting of the portion a, to which the piston rod is secured, the side pieces, b and b', transverse pieces, c and c', the pin, d, the sliding blocks, B and B', and screw studs, D D, the whole being arranged as and for the purpose herein set forth.

54,458.—Washing Machine.—Abel C. Whittier, Lawrence, Mass.:

I claim the combination of the slotted arm, e, spur, H, slot in lever, I, levers, M, rods, N, and spring, o, for the purpose herein set forth and described.

54,459.—Fence.—Eli York, Windsor, Ill.:

I claim the manner herein described of constructing fences, whereby a strong and durable fence may be put up, without any essential preparation of the timber composing the fence, substantially as specified.

[The object of this invention is to construct a fence of such material as is usually found lying around when clearing off timber land, without the necessity of any carpentering or preparation of the material, and at the same time provide a strong and very durable fence.]

54,460.—Brick Press.—William Baker and Gaylord Martin, Schenectady, N. Y. assignors to Empire State Machine Company:

First, We claim providing a press box which is attached to a pug mill with a yielding gate, h, which will operate to relieve the press from obstructions, substantially as described.

Second, Constructing the bottom of the press bore of grate bars, g, of a loze ge shape, or of such shape that they will direct the clay, or other substance under pressure in said bore, toward the ends of the mold boxes, substantially as described.

54,461.—Manufacture of Varnish.—Edwin Battley (assignor to himself and James Crane), Mount Clare, N. J. Antedated April 16, 1866:

I claim a varnish compound in which creosote or carbolic acid is used as the solvent of the gum, such as rosin, substantially as set forth.

Also the composition of a rosin dissolved in carbolic acid with lamp black, substantially in and for the purpose specified.

54,462.—Waterproofing Cork and other Materials.—David E. Breinig (assignor to himself and A. C. Crondal), New York City:

I claim the use of metallic gum, such as herein described for treating cork, leather or other fabrics, in the manner and for the purpose substantially as set forth.

Also forming the metallic gum on the fabric by first dipping it in the alkaline solution, and afterward in the solution of the proper metallic salt as described.

54,463.—Picture Frame Clamp.—John A. H. Dunne, Boston, Mass., assignor to James E. Rogers, Chelsea, Mass.:

I claim the combination of the adjustable cross or bars, B C, the sliders, the rope and the windlass, the whole being arranged and applied together, and to a table substantially as and so as to operate as and for the purposes specified.

54,464.—Brush.—Lemuel P. Faught, Foxboro, Mass, assignor to himself and William T. Cook, Boston, Mass.:

I claim the hollow metallic cone or thimble, D, substantially as and for the purpose set forth.

54,465.—Bobbin for Spinning, Etc.—Levi Ferguson, Lowell, Mass., assignor to himself and D. M. Weston, Boston, Mass.:

I claim the arrangement of the slit or slits entirely in the shank or body, and above the head of the bobbin, substantially as described.

54,466.—Harvester.—B. G. Fitzhugh (assignor to himself, John M. Griffiths and James Brewster), Baltimore, Md.:

I claim so combining locking arms with the wheels of a harvesting machine and with appliances substantially such as herein described, so that while the driver or conductor is in his seat stand or position, the locking arms shall be held out of action, and when he is thrown from or leaves his seat, stand or position, said locking arms shall be immediately thrown into action, as and for the purpose herein described.

54,467.—Hoisting Apparatus.—Samuel C. Goodsell and Dennis Frisbie (assignors to themselves H. D. Bigelow and David P. Calhoun), New Haven, Conn.:

We claim the combination the trip, T, with the two pawls, I and L, when constructed and arranged to operate so that the two said pawls act to hoist or lower, substantially as and for the purpose specified.

54,468.—Machinery for Making Eyelets.—Edwin E. Marsh (assignor to American Eyelet Company), Providence, R. I.:

First, I claim the use of a plunger, 1, having a roughtened surface as described in combination with the die in which the eyelet is formed, for the purposes specified.

Second, The use of a plunger capable of lateral contraction and expansion in combination with the die within which the eyelet is formed substantially as described for the purpose specified.

54,469.—Combined Steam and Water Motor.—Frank Millward (assignor to himself and Thomas H. Foulds), Cincinnati, Ohio:

First, I claim a reaction water wheel or turbine whose receiving end is provided with a nozzle for the discharge into said wheel of steam, substantially as and for the purpose set forth.

Second, In the described combination with the reaction wheel or turbine, A b b', I claim the injector, D c, substantially as set forth and for the purpose specified.

Third, I claim the tank, B, and supply pipe, C c, in the described combination with the injector, D c, and wheel, A b b', as set forth and for the purpose specified.

54,470.—Cupola Furnace.—Charles Truesdale (assignor to himself and Wm. Resor & Co.), Cincinnati, Ohio:

First, I claim the provision in a cupola or melting furnace of one or more vertical series of tweers with graduated or decreasing vantages toward upper portion of the series, substantially as set forth.

Second, The arrangement of one or more vertical series of tweers which project beyond the common or general lining wall, and are protected by vertical pliers, substantially as set forth.

54,471.—Wrench.—C. C. Webber (assignor to himself, and Warren M. Smith), Springfield, Mass.:

I claim the combination of the jaw, B, bar, A, screw rod, E E', handle, c, and nut, b, and head, F, substantially as specified.

54,472.—Blacking Brush.—Nathaniel G. Whitmore (assignor to himself and Edward L. Day), Mansfield, Mass.:

I claim a blacking brush, A, provided with a sliding drawer, a, substantially as and for the purposes set forth.

54,473.—Mop.—Moses H. Wiley (assignor to himself C. J. Cob and J. Ames), Bucksport, Maine:

I claim the arrangement and application of the mop and the two levers and one or more squeeze rollers, the whole being applied together so as to operate substantially as specified.

I also claim the arrangement of the mop, and the two levers as described.

54,474.—Rudder.—J. McGrigor Croft, London, Eng.:

I claim the application or form of diagonal curved or oblique blades to rudders, substantially in the manner and for the purposes above described.

54,475.—Refrigerator.—Charles Flack, Middlesex County, England:

First, I claim the combination as well as the arrangement of the cooling chamber, a, the chamber, c, for holding ice, the waste water receptacle, e, and the pipe or conduit, f, connecting the chambers, c and e, as set forth.

Second, I also claim the combination as well as the arrrangement of the vessel, d (for holding water or a liquid), and its eduction pipe, d, with the ice chamber, C, and the cooking chamber, a, as explained.

Third, I also claim the combination as well as the arrangement of the vessel, d (for holding water as a liquid), and its eduction pipe d', with the ice chamber, c, and the cooling chamber, a, and the waste water chamber, e, the whole whole being substantially as set forth and represented.

54,476.—Machine for making Fillers for Cigars.—G. Albert Reiniger, Stuttgart, Kingdom of Wurtemberg:

First, I claim placing the journal boxes of the driving shaft above the endless aprons, E. F. instead of below as heretofore, substantially as and for the purpose specified.

Second, The vertical shaft, a', with arms, e' f' h, in combination with the cam, b', and the driving shaft and with the rock shaft, e', and the jaws of the receiving apparatus constructed and operating substantially as and for the purpose set forth.

Third, The lantern, p, in combination with the eccentric, h, on the driving shaft and with the receiving apparatus, K, and endless aprons, E F, constructed and operating substantially as and for the purpose described.

Fourth, The gear wheels, s t v, and cogs, w, in the side of the rack, H, in combination with the lantern, p, and receiving apparatus, K, constructed and operating substantially as and for the purpose set forth.

Fifth, The gate, r, in combination with the endless aprons, E, F, knife, g, and receiving apparatus, K, constructed and operating substantially as and for the purpose specified.

54,477.—Composition for Fuel.—Francis Stoker, Lyons, France:

I claim the exclusive use, First, of the combustable substance or fuel, to whatever purpose it may be applied.

Second, Of the foot warmer, smoothing iron, stir-up apparatus and soldering iron, the whole substantially as herein before described, and illustrated on the accompanying drawings.

54,478.—Switch for Replacing Cars upon Tracks.—Nathan Pullman, New Oregon, Iowa:

First, I claim the shoes, E, attached to the cross bar, F, in combination with the beveled rails, C, on the movable rails, B, all arranged to operate as shown and described.

Second, In combination with the rails, B, I claim the chair, H, and the supplementary rails, D, arranged to operate as and for the purpose set forth.

EXTENSIONS.

8,624.—Construction of Bridges.—Wendal Bollman, Baltimore, Md. Patented Jan. 6, 1852.:

I claim the combination of the tension rods, e, connecting the foot of each strut with each end of the stretcher, substantially as described, by which an independent support is given to the strut carried back directly to the abutment, while at the same time no lateral force or strain is brought upon the abutment, as herein fully set forth.

8,654.—Ornamental Connection of the Parts of an Iron Fence.—Henry Jenkins, Brooklyn, N. Y. Patented Jan. 13, 1852. Reissue No. 807. Dated Sept. 6, 1859:

I claim forming the ornament or cast iron connections for a railing fence, or other article of iron cast into a divided iron mould, substantially as and for the purposes specified.

8,659.—Buckwheat Fan.—Alfred Platt, Waterbury, Conn. Patented Jan. 13, 1852.:

I claim the method of separating the hulls from the kennels of buck-

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wheat, by shaking them on a table or tables, made slightly concave or rough, substantially as specified, in combination with a current or currents of air blown over the surface of such table or tables, to carry off the hulls, whilst the kernels are retained or held back by the form of the surface of the table or tables, as specified.

8,683.—Ring Spinner.—Martha A. Dodge, Bedford, Mass., Administratrix of the Estate of Geo. H. Dodge, deceased. Patented Jan. 27, 1852:

I claim the combination of the standard or projection, B, with the ring and traveler, substantially in the manner and for the purpose of removing or loosening waste from the latter, as specified.

8,720,—Harvester.—B. Densmore, New York City. Patented Feb. 10, 1852. Reissued Jan. 28, 1862:

I claim, First, Hanging the driving wheel in a supplementary frame or its equivalent, which is hinged at one end to the main frame, while its opposite end may be adjusted and secured at various hights, or be left free, as desired, whereby the cutting apparatus may be held at any desired hight for reaping, or be left free to accommodate itself to the undulations of the ground, for mowing, substantially as described.

Second, The employment, in a harvesting machine, of a wheel, provided with a crank and lever, for the purpose of raising and lowering the outer end of the finger-bar, to cut high or low, substantially as described.

8,724.—Grass Harvester.—Louisa R. Ketchum, Buffalo, N. Y., Administratrix of Estate of Wm. F. Ketchum, deceased. Buffalo, N. Y. Patented Feb. 10, 1852. Reissued Feb. 28, 1854. Re-reissued Jan. 2, 1857:

I claim, First, Extending the shoe, H G, from the heel of the rack or finger bar upward and forward, and firmly connecting its continuation with the draught when the finger bar is located as set forth, so that the power by which the machine is drawn, shall, through the shoe, be communicated to and draw forward, the heel of the rack or finger bar thus relieving the great strain which would otherwise come upon the lateral connections of the rack or finger bar with the wheel frame, while the heel is enabled to slide over obstructions, substantially as shown.

Second, When the main wheel and inner end of the finger bar or rack, D, are located, relatively as described, I claim continuing the shoe, H G, from the heel of the rack or finger bar upward and f rward, until the upper end of its extension reaches a part of the machine which always runs above the mown grass, and which will keep the said grass down and prevent its rising over the point of the extended shoe, thus aiding the shoe to ride over the mown grass, even when accumulated before it, substantially as shown.

Third, Supporting the heel of the rack or finger bar sufficiently near the ground, and at a convenient distance latterly from the main wheel by arms extending upwards and forwards, and upwards and backwards therefrom, and connected with the frame or strong bars firmly bolted across the frame in front and rear of the said rack or finger-bar, while the said frame and bars are elevated to pass over the cut grass, and the above parts are arranged, substantially as shown.

Fourth, Supporting the rack or finger bar at the side of and lower than the main frame by means of auxiliary framing in a fixed position at the side thereof, and extending downwards and forward, so that while the finger bar is held as near the ground as desired, and lower than the main frame, the main frame may be nearly horizontal, in the line of draught and at any convenient hight, to avoid clogging or accommodate the diameter of the main wheel, as shown; such an auxiliary frame as a whole is shown in the drawings, composed of the bar, c, rods, E E I, and rack or finger bar, D; but its details may of course be varied, while the principle of my invention is retained.

Fifth, Supporting the rack or finger bar, D, in its position at the side of and lower than the main frame, by extending a strong bar, c, behind said rack or finger bar, firmly supported by said frame, and rigidly connecting said rack or finger bar to said bar, C, by a straight brace or braces, E E', said frame being elevated, and said bar being elevated, and placed sufficiently in rear of said rack or finger bar, to avoid clogging, or lodging of the mown or falling grass against either, when said parts are arranged in relation to each other, substantially as shown.

Sixth, Supporting the outer end of the rack or finger bar by a rod extending downwards and forwards from the cross bar, c, to the finger bar, parallel or nearly so, to the face of the main wheel, when the frame and bar, c, are elevated above the rack or finger bar, in the manner and for the purposes contemplated in the last claim, to avoid the falling or clogging of the cut grass against such rod, as set forth.

8,769.—Drying Grain.—Henry G. Bulkley, Kalamazoo, Mich. Patented March 2, 1852. Reissued June 27, 1854:

I claim the method of seasoning or kiln-drying substances, by using steam in a vessel, which has an opening communicating with the atmosphere to limit the pressure for the purpose of transmitting caloric to the substances to be seasoned or kiln dried, or the vessel or vessels containing them, substantially as specified.

8,756.—Manufacture of Zinc White.—Martha M. Jones, Staten Island, N. Y., Administratrix of Estate of Samuel T. Jones, deceased. Patented Feb. 24, 1852.:

I claim the use of a porous or fibrous bag or receiving chamber, with porous sides or bottom, or an air-tight chamber with a straining or porous bag adapted to the inside thereof, and used in connection either with a blowing or exhausting apparatus, so that the products of the distillation and oxygenation of zinc or other volatile metals may be separated from the accompanying air and gases, which latter will be forced, or otherwise drawn through the pores of the cloth bag or chamber, and escape into the atmosphere.

8,778.—Machines for Printing Floor Cloth.—Simeon Savage, Pomfret, N. Y. Patented March 2, 1852.:

I claim the arrangement of the printing mechanism, the stamping down mechanism, and the mechanism for advancing the piece or strip of cloth, or of material to be printed and pressed, or stamped, such arrangement being as exhibited in the drawings, and as above described.

And I also claim the combination of the lip, bar or plate, y, the series of bent levers, a' a, etc., the slide bar, R' or S, and the bar c', as made and operated, substantially in manner and for the purpose of seizing the selvedge edge of the cloth, and moving the piece, as described.

And I also claim the combination of mechanism for operating the closing carriage, or imparting to it its back and forth movements and necessary intervals of rest, the said combination consisting of the rotary shaft, O, with its circular disks, Q R, and their projections, i k, the four hook bars, l l p p, together with the vibrating bars, n o, as applied together, and operated substantially as specified.

8,789.—Canal Lock Gate.—Charles Neer, Brooklyn, E. D., N. Y. Patented March 9, 1852:

I claim, First, The opening of the lower gates of a canal or river lock, outwards or down stream, in combination with the means described, or their equivalent for operating them, for the double purpose of saving length in the lock chamber with the same walls, and for allowing the gates to be opened before the chamber is entirely empty, so that the escaping water may carry out with it the boat, raft, or other thing being passed through, with the least possible delay.

Second, I claim the standing gate at the head of the lock which forms with the breast wall of the lock, with the top of which it is level, a recess, or a chamber, through which the lock chamber may be filled, at any desired hight above the bottom of the lock, and thus save length of lock wall,

Third, I claim, in combination with the stationary gate, the sinking head gate, extending across the lock, and reaching down a little below the top of the stationary gate when the gate is shut, and which sinks or slides into the recess formed in part by said stationary gate, and is on a level therewith when open, for passing boats, etc., for the purpose of saving in the length of the lock chamber, an amount nearly equal to the width of the gate.

Fourth, I claim the so placing of an adjustable batten or water strip on the bottom of a lock as that it may be operated upon by the pressure of the water within the lock chamber, and be forced up against the gate when prevented from being closed tight, by an intervening substance, substantially in the manner herein set forth and described.

8,810.—Pattern Card for Jacquard Looms.—Samuel F. Thomas, Laconia, N. H., and Eliza A. Adams, Townsend, Mass., Administratrix of Estate of Edward Everett, deceased. Patented March 16, 1852:

We claim the combination of the buttons with the metallic card, as described, the buttons being so riveted or attached to the card as to allow of their being turned for the purpose of closing or opening the holes, to which they are respectively attached.

8,848.—Smoothing Iron.—Nicholas Taliaferro, Augusta and William D. Cummings, Marysville, Ky. Patented March 30, 1852.:

We claim the application (substantially as described) to a self heating smoothing iron, of a tube or chamber, j, at the bottom of the fire box, provided with a registered mouth or inlet, i, some distance above the bottom, and at its lower portion with distributing apertures, k, communicating with the fire, whereby the draft is applied from beneath and equally at every part, and placed under the control of the operator, without permitting the escape of ashes, or other refuse of combustion.

8,828.—Cracker Machine.—John McCollum, New York City. Patented March 23, 1852. Reissued May 31, 1859:

I claim the combination of adjustable springs with a cracker cutter and its resisting surface or bed, substantially as herein before described and substantially for the purposes herein before set forth.

8,832.—Air-Heating Stove.—J. M. Thatcher, New York City. Patented March 23, 1852. Reissued Sept. 11, 1855:

I claim making the bottom plates of the flue spaces of air-heating furnaces or stoves, for the passage of the products of combustion outward or inward, mong or around the air passages, inclining inwards and downwards toward the fire chamber, substantially as described, for the purpose of facilitating the increase of the heating surface, without the inconvenience of the accumulation of ashes, soot, and other solid matter, in such plates, as set forth.

And I also claim the combination of the inverted domes or frustums, F I M, and plate, P, with the short tubes, b b f f i l l, connecting them, substantially in the manner herein described, for the purpose of effecting the connection between the lower ends of the fire or draft flues, and carrying the air through them to the spaces between the cylinders or tubes.

8,861.—Smut Mill and Grain Separator.—Daniel Shaw, Elkhart, Ind. Patented April 6, 1852. Reissued Nov. 3, 1863:

I claim the offset, that is to say enlarging the space of the hollow trunk on the opposite side thereof from that at which the grain is admitted, in combination with the screen, e, spout, f, and the passage and valve, g, for taking the dust, etc., into the fan case, whereby the cheat and light grain, which will pass up the spout with the impurities, is effectually separated and delivered through the spout, f, substantially as herein fully set forth.

8,851.—Moth Trap to Beehives.—E. W. Phelps, Elizabeth, N. J. Patented April 6, 1852:

I claim the peculiar construction of the moth trap, as herein described, composed of a slide having the center groove and two side grooves, and the metallic hinged cover, arranged, all as set forth in the specification.

8,888.—Capping of Screws.—Charles T. Grilley, New Haven, Conn. Patented April 20, 1852:

I claim the attachment of a brass, copper, or other suitable metallic cap to, and its combination with, an iron-wood screw, substantially in the manner and by the process described in the foregoing specification (which I conceive to be the only practicable method in which the same can be usefully effected), whereby, and by means of the successive operations of punching or stamping, the nick is first cut through the shell, and then, after being adjusted to the groove or slot in the head of the screw the sides thereof are driven down into and made to press closely against the sides of the slot, leaving the bottom of the groove or slot uncovered, so that the cap when closed round the head of the screw, will preserve its hold without liability to be turned or displaced by the screw driver, which works upon the iron surface at the bottom of the slot, and against the covered sides thereof, thereby furnishing to the public, at a comparatively small cost, a wood screw having all the beauty and finish of a brass, copper, or plated screw, in combination with the greatly superior strength of an iron one. The invention is equally applicable to steel screws, which may be capped in a similar way.

8,881.—Feed Apparatus of Planing Machines.—Joel Whitney, Winchester, Mass. Patented April 13, 1852:

I claim the arrangement by which the upper feed roll is allowed to yield to any inequalities in the board, and at the same time draw down upon the surface to which it has yielded, in proportion to the resistance to the cutting tools; that is, connecting the fixed shaft with the vertical sliding bearings of the upper feed roll, by means of the swinging, inclined, and vertical arms, m and k, the gears on the fixed shaft operating the lower feed roll, and also playing into the gears which move the upper feed roll, said latter gears having their bearings in the intersection or joint of the said arms, the arrangement being substantially as herein above set forth.

REISSUES.

2,234.—Cartridge Extractor for Fire-arms.—Henry Reynolds, Springfield, Mass. Patented Nov. 22, 1864:

First, I claim a cartridge shell ejector, consisting of a lever attached to the frame of the fire-arm, and so constructed and arranged that by a suitable movement, a portion of it is made to enter an opening in the chamber or chambers between the breech or rear end thereof, and the bottom of the cartridge shell, substantially as and for the purpose herein described.

Second, So beveling the bottom of the chamber of the fire-arm as to provide for the entrance of the lever between it and the rear end of the cartridge shell, substantially as herein described.

2,235.—Self-loading Fire-arm.—Spencer Repeating Rifle Company (assignees by Mesne assignments, of C. M. Spencer), Boston, Mass. Patented March 6, 1860:

First, I claim the combination of the rolling breech, E, the lever, G, and sliding locking bolt, F, the whole fitted and applied substantially as herein set forth.

Second, The slide, H, applied to the rolling breech, and operating in combination with the hammer, substantially as described.

Third, The rolling breech, E, constructed as described, to operate as a carrier block, to receive the cartridge from the magazine and deposit it in the chamber in the end of the barrel, and also to cut off all communication between the chamber and magazine when the piece is loaded.

Fourth, The serrated projection, u, constructed, arranged, and operating as described.

Fifth, The tongue, J, constructed, arranged, and operating as described.

2,236.—Breech-loading Fire-arm.—Rollin White, Lowell, Mass. Patented April 3, 1855:

First, I claim the movable breech, connecting with, and operating with the tumbler and hammer, and on the same fulcrum pin, substantially as herein described.

Second, The plate applied, substantially as described, to serve as a guide to conduct the cartridge into the open chamber, and as a guard to prevent the cartridge falling out at the rear of the chamber before the breech is liberated, as herein set forth.

Third, I claim making an aperture into the chamber, and constructing the hammer, or its equivalent, so that it will ignite the charge by striking the cartridge in front of the rear end thereof, substantially as and for the purpose specified.

DESIGNS.

2,295.—Frame of a Sewing and Embroidering Machine.—Joseph W. Bartlett, New York City.

2,296.—Picture Frame.—John H. Bellamy, Charlestown, Mass., assignor to self, Syrus W. Stout, Boston, and Benj. Brown, Somerville, Mass.

2,297.—Weather Boarding.—John H. Clark and John Rhinesmith, Fort Wayne, Ind.

2,298.—Trade Mark.—Franklin O. Day and William S. Stewart, St. Louis, Mo.

2,299.—Trade Mark.—Franklin O. Day and William S. Stewart, St. Louis, Mo.

2,300.—Trade Mark.—Franklin O. Day and William S. Stewart, St. Louis, Mo.

2,301.—Hand Stamp.—H. H. Grosskoff, Philadelphia, Pa.

2,302.—Cook's Range.—Jno. Martin, Jacob Beesley, and John Currie (assignors to J. S. Clark), Philadelphia, Pa.

2,303.—Railing.—John McArthur, Philadelphia, Pa.

2,304.—Tobacco Pipe.—Louis Saarback, Philadelphia, Pa.

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Improved Valve Gear.

The following description from the inventor will explain the nature and object of the invention illustrated in the annexed engraving very clearly:—

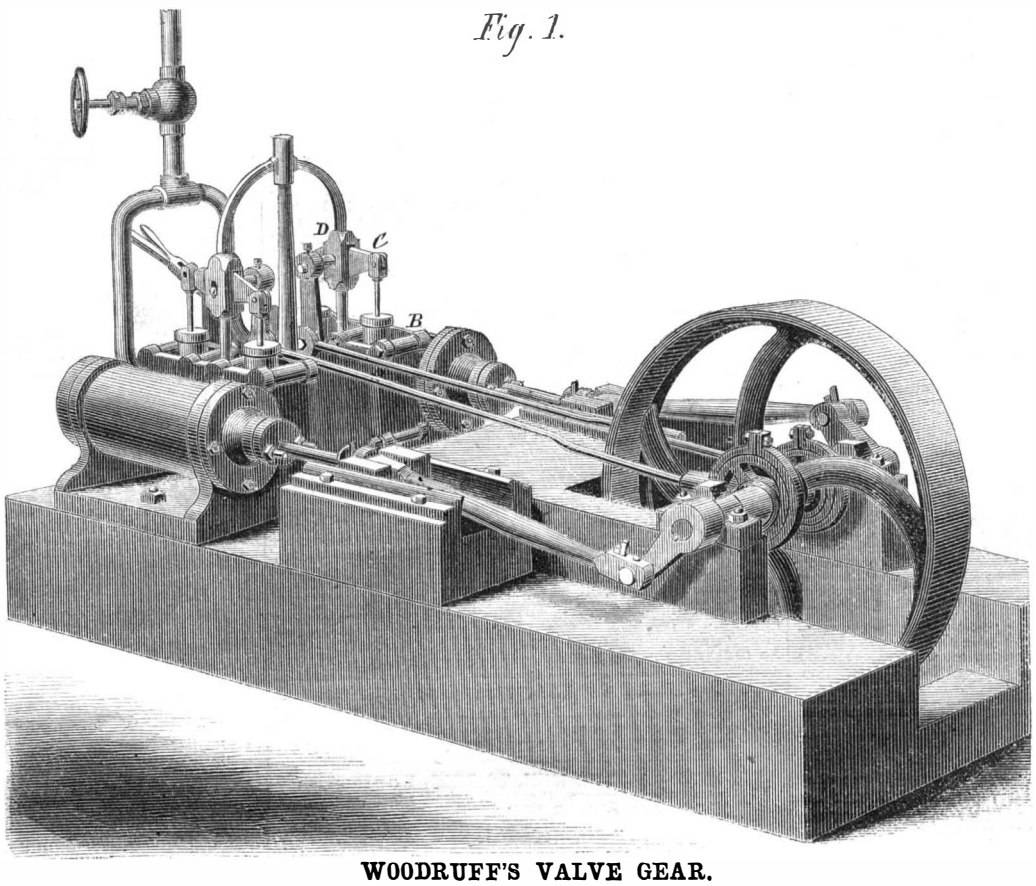
"The object of this invention is to reverse steam engines of any size, instantly, without shutting the throttle valve, and by a single eccentric, as in reversing, the valves are changed so that one edge of each valve is raised for one motion, and the opposite edges for the opposite motion, as in passing the valves over from one motion to the other, the exhaust ports in the valves open to the receiving ports in the cylinder, and consequently exhaust the steam that is in the cylinder at the time of changing, so that there is no steam shut up in the cylinder, and there are no sudden jars on the machinery in reversing instantly. In changing over from one motion to the other, the valves can be so stopped as to give them a small opening; by stopping the lever that moves the valves, at a little more than midway between the two motions; or it can throw the full working pressure instantly against the piston without danger to the machinery. By stopping on the center it will shut the steam entirely from the cylinder so that the engine can be stopped, started, or backed by the use of a single lever. In very large engines I balance the valves and gear by letting the end of the movable column run into the steam chest, and fitted with stuffing box, the same as a piston; so that there will be no trouble in working the engines, from locomotive to ocean steamers. Aside from the reversing, I consider it the most economical slide in use. In the first place, it is nearly balanced by taking steam on the inside of the valve as soon as it commenced to open to the steam, as there is no lap on the receiving side of the valves. In the second place, they take steam through two recesses in the seats on the opposite edge of the valves, both in the exhaust and receiving side of the valves, so that it gives a full opening on the commencement of the stroke, and remains the same to nearly the end, as the steam goes to the piston from the inside of the valve at the same time it takes from the outside; the opening receiving the same after the valve gets one-third of its throw; for after that it is closing on the inside as it opens on the outside; and by that means get the full rise of the steam through the whole length of the stroke with the same opening.

"I claim another advantage in exhausting: as there is no lap on the receiving side of the valve it is left full open to the exhaust as soon as it cuts off, and the exhaust port is made longer than the receiving port, thereby giving more opening to the exhaust, with the same throw of the valve. I also use an exhaustion slide or movable seat on the exhaust side, so that by moving it above or below the line of the receiving part, I can exhaust the steam at any part of the stroke, without interfering with the working of the valve in any other respect, and making a variable expansion without any lap on the valve.

"In order to make a variable cut-off to work both ways alike, I would use two eccentrics with a short link, one set for full stroke and the other as short as desired, and to be used only for a cut-off, as the reversing is done by shifting the valves. This valve is useful for locomotives, as it gives a full port of steam when cutting off at less than one-third of the stroke, without giving the valve lead. The link can be short, as the eccentrics are so set that they work nearly in the same direction, driving most of the throw. The link can be so arranged as to leave it stationary while reversing, so as to throw back on to full stroke when reversed, without moving the link.

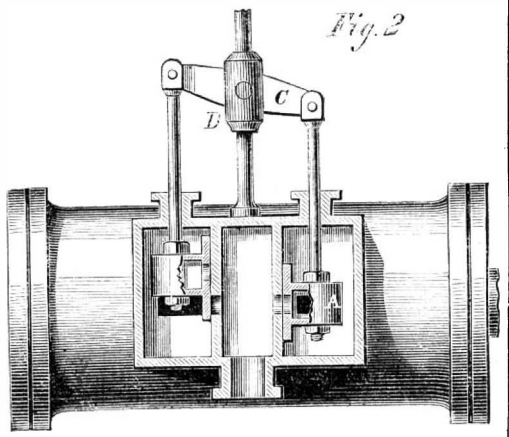
"The arrangement consists in angular slide valves, A, working at right angles with the piston, one for the induction and eduction of steam at one end of the cylinder, and the other for the same purpose at the other. The valves are worked by means of a rock shaft supported on a movable column, D, running into the steam chest midway between the valves, with arms, C, extending so as to connect the valve rods at either end of the cylinder. The top, or opposite end of the movable column is supported by moving through an arched guide. The reversing consists in moving or passing the valves over the ports so that one end of each valve is used for going in one direction, and the opposite edge for the other direction. The operation is performed by connecting a lever to said column and working across the cylinder, or any other suitable position, and the opposite end working through a segment with notches, so as to take a catch or spring to hold the valves when moved to the position for stopping, backing, or slowing the engine. A small model of a double engine is shown in the engraving, that was made simply for exhibition, and the reversing gear was arranged to accommodate the working of it. The cylinders stand only sixteen inches apart, from outside to outside, and are 2 inch bore and 4 inch stroke."

Fig. 1.



WOODRUFF'S VALVE GEAR.

Fig. 2



For further information, address the inventor, A. H. Woodruff, at Lansing, Iowa, by whom it was patented, through the Scientific American Patent Agency, on Dec. 27, 1864. Application for patent is pending in other improvements.

Water Fuel.

Few persons are aware of the large percentage of actual moisture that abounds in most fuels. The careful housewife, desirous to economize her fire, "backs" it up with cinders. The poor employ wet tan. And there are not many, I suppose, who have not watched the nailer with curious interest, when, after a good sprinkle with his handbroom, previously dipped in water, he had made his smithy fire glow again with a very few blasts of his bellows. The Rev. M. Moule, of Dorchester, has had constructed a cooking stove, in which the combustion, to a certain extent, of water is attempted, but with what success I have no exact means of knowing. A year or two back some trials, in respect to the combustion of wet fuel, were reported in *Chambers' Edinburgh Journal*. The results were perfectly marvelous. Fuel containing actually, I believe, 70 per cent. of moisture was burnt in an arched brick stove or furnace. The heat produced was so intense as, if I recollect rightly, the thick wrought iron door having been previously closed, to raise to whiteness the arch of the oven. The fire, indeed, in the first instance, was lighted with dry fuel; but afterwards the wet fuel was exclusively resorted to. Surely, here are indications of no little importance in a country where the normal state of our natural fuel is one of excessive moisture.—Cooking, heating, drying, lime and brick burning, wherein indeed vast quantities of water are burnt as it is, besides various other economic processes involving the application of heat, might probably be effected by the employment of wet fuel.—*London Morning Journal.*

["Water burning stoves" are no novelty. It has been shown by experiment that the heat obtained from the decomposition of water is exactly equal to the heat required to decompose it.—EDS.

MECHANICS

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